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# AUTOMOTIVE INDUSTRIES

Volume 60  
Number 17

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## CARS THAT STAY YOUNG



### Cars That Stay Young

CROSSES INDICATE "TIMKEN-EQUIPPED" POINTS

MAKE	MODEL	Front Wheels	Rear Wheels	Pinion	Steering Knuckle	Differential
Auburn.....	All	x	x	x	x	x
Cadillac.....	All	x	x	x	x	x
Chrysler.....	De Soto	x	x	x	x	x
	Plymouth	x	x	x	x	x
	65 & 75	x	x	x	x	x
	Imperial	x	x	x	x	x
Cunningham....	All	x	x	x	x	x
Dodge.....	All	x	x	x	x	x
Durant.....	40, 60, 66	x	x	x	x	x
	70	x	x	x	x	x
Elcar.....	75	x	x	x	x	x
	95, 96, 120	x	x	x	x	x
Ford.....	All	x	x	x	x	x
Franklin.....	All	x	x	x	x	x
Gardner.....	All	x	x	x	x	x
Graham-Paige..	612	x	x	x	x	x
	615	x	x	x	x	x
	621, 827, 837	x	x	x	x	x
Hudson and Essex	All	x	x	x	x	x
Hupmobile.....	Century 6	x	x	x	x	x
	Century 8	x	x	x	x	x
Jordan.....	All	x	x	x	x	x
Kissel.....	75 & 95	x	x	x	x	x
	126	x	x	x	x	x
Kleiber.....	All	x	x	x	x	x
LaSalle.....	All	x	x	x	x	x
Lincoln.....	86 & 88	x	x	x	x	x
Locomobile.....	68	x	x	x	x	x
	78	x	x	x	x	x
Marmon.....	Roosevelt	x	x	x	x	x
McFarlan.....	All	x	x	x	x	x
Moon.....	All	x	x	x	x	x
Nash.....	Std 6	x	x	x	x	x
Peerless.....	All	x	x	x	x	x
Pierce-Arrow...	All	x	x	x	x	x
Reo Flying Cloud	The Master	x	x	x	x	x
	The Mate	x	x	x	x	x
Roamer.....	6-80	x	x	x	x	x
	8-90	x	x	x	x	x
Stearns-Knight..	All	x	x	x	x	x
Studebaker and Erskine...	All	x	x	x	x	x
Stutz.....	All	x	x	x	x	x
Willys Knight and Whippet..	All	x	x	x	x	x

WHEN motorists want to know how far cars will go... how long they will defy torque, thrust, speed and shock... how many care-free miles are assured... they refer to the list of Cars That Stay Young, noting the names of the prominent cars which are Timken-equipped and the points where Timken Bearings are used; and they let that be a deciding factor in buying.

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*Further information regarding the new Ditzler Intermix Series will be mailed promptly upon request.*

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DITZLER COLOR COMPANY DETROIT, MICHIGAN

# AUTOMOTIVE INDUSTRIES

## AUTOMOBILE

Reg. U. S. Pat. Off.  
Established 1902

Vol. 60

No. 17

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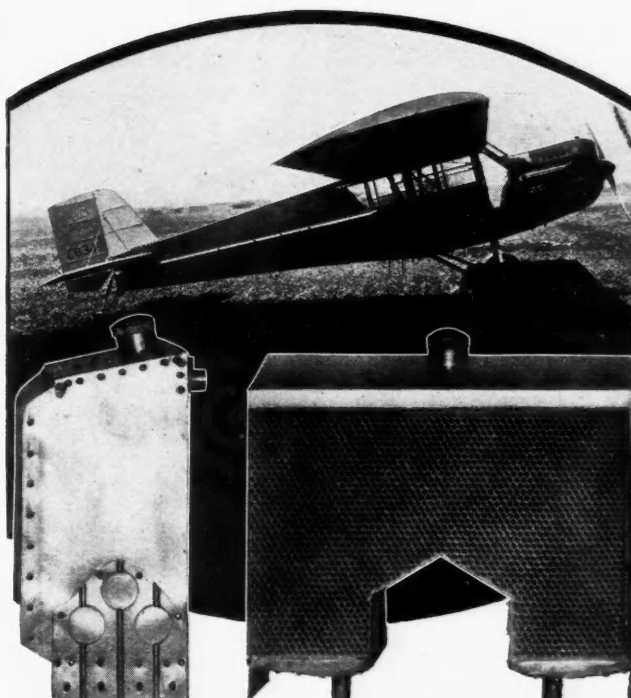
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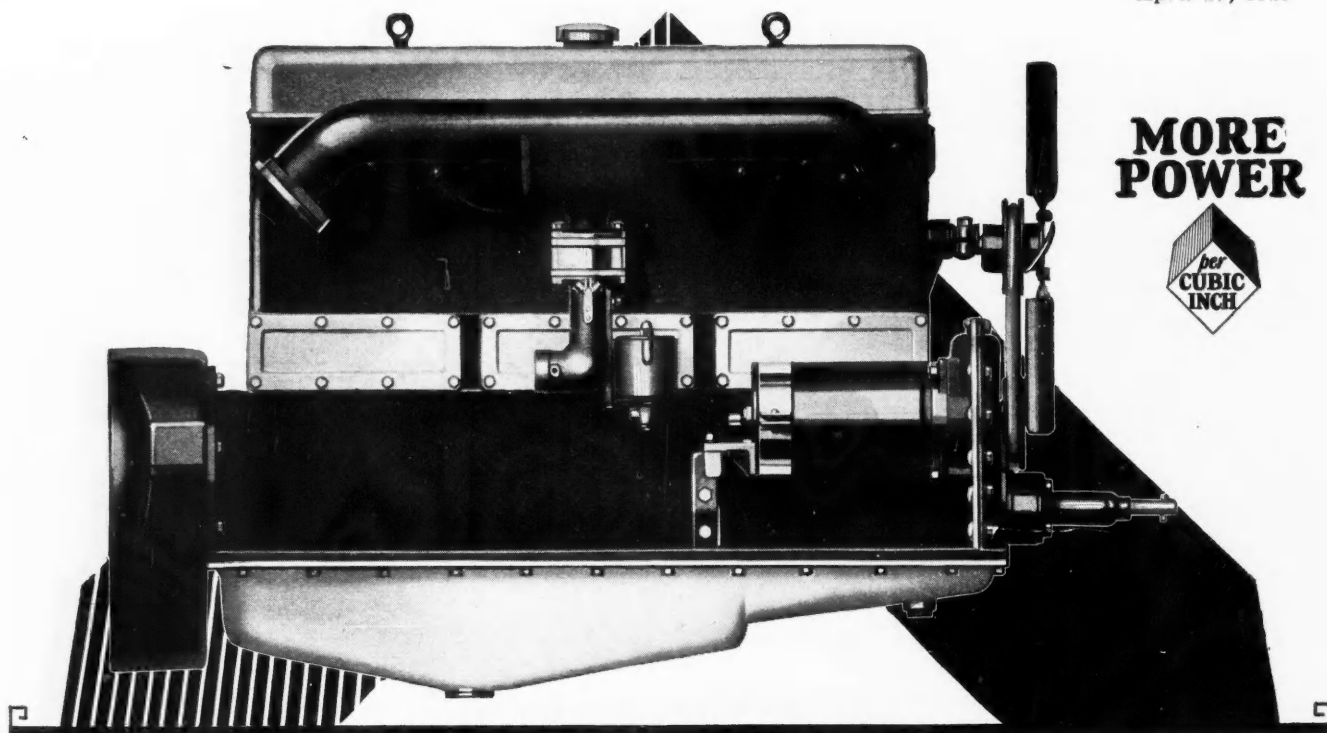
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Young Radiators Are Used Where the Going Is Tough





**MORE  
POWER**



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Built in a full range of Sixes and Fours, from 20 to 150 H.P., for trucks, buses, tractors and industrial machinery.

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CONSISTENT



# AUTOMOTIVE INDUSTRIES

VOLUME 60

Philadelphia, Saturday, April 27, 1929

NUMBER 17

## Automotive Export Growth Needed to Maintain Production Rates

Further cultivation of foreign markets through friendship, advertising and service urged upon manufacturers by foreign traders.

By EARL O. EWAN

AMERICAN automobile manufacturers must continue to cultivate overseas markets for the motor car if their present mass production schedules are to be maintained, in the opinion of speakers who last week addressed the 1700 delegates in attendance at the Sixteenth National Foreign Trade Convention held in Baltimore, Md.

Captain Robert Dollar, veteran Pacific Coast steamship operator, not only concurred in the statement but credited foreign trade with having made possible mass production through creating an overseas field for sales. The result in the automotive industry has been, he said, that motor car makers have been enabled to employ the highest-priced labor and to sell their output to the lowest-priced labor.

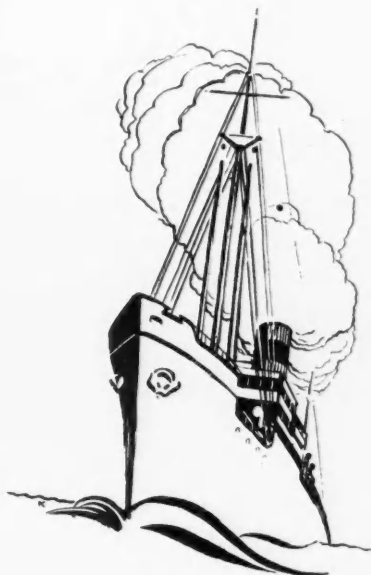
Continuance of mass production at the current rates of turnout increases can be guaranteed only by the constant growth of mass marketing, particularly abroad, it was asserted also by E. G. Simons, of New York, Vice-president of the American Foreign Credit Corporation. For the United States to maintain its present prosperous state, it is essential, he contended, that it be made possible for our foreign customers to buy. Mr. Simons recommended the extension of the installment selling plan abroad as a means of augmenting the purchasing power of overseas customers.

"This is an era of merchandising rather than selling," Mr. Simons asserted. "We must create sales rather than take orders. In order to create a sale, it must be worked out on scientific lines with some one taking a commercial risk, but protecting himself by various methods so as to minimize the risk. The same possibilities for broadening the market by putting the product within the reach of the buyer exist in foreign countries that have

been proved here. The possibilities exist both in articles for personal use, such as automobiles, electric refrigerators and pianos, and in engineering lines, such as construction machinery, industrial equipment, public utilities and municipal improvements. Since persons or corporations can pay only within the reach of their capacity to earn, it is far better to arrange payment within that capacity than to set arbitrary terms. Letter-of-credit terms or even ninety-day draft terms which do not take into account the buyer's actual situation, do not create business. But, if we can determine an economic formula that will permit the customer to pay over a period of time within the range of his capacity to earn, we will have a better and more economic credit. When we arrange that better and more economic credit, we shall have installment selling."

Payment-plan selling that after the war provided for the absorption of the staggering over-capacity of our factories, which had been constructed to supply foreign markets cut off by embargoes from European manufacturers, has since increased our production greatly, Mr. Simons explained. We have discovered, he continued, that one man plus 3½ horsepower intelligently applied, equals five men. With a little over six per cent of the world's population, he said, we are producing over 55 per cent by value of its machinery and consuming 50 per cent.

If exports are to be increased, a similar growth in imports must come about, since "imports are the measure of exports," it was held by Henry F. Grady, Professor of International Trade and Dean of the College of Commerce of the University of California, Berkeley, Calif. Import restriction handicaps exports, he contended, declaring that "competition in barrier raising is



like competition in armaments, it leads to international stultification."

"By excluding the foreign manufacturer," said Professor Grady, "the American manufacturer has the domestic market for himself and other American producers of the same product. Prices can be maintained at a higher level until competition and production among domestic manufacturers or producers becomes so intense that his prices will be lowered, perhaps even beyond that of the outside producer. This situation already has developed in a number of industries, both manufacturing and agricultural. I think the automotive industry is a case in point. In fact, all the larger-scale production industries, though protected, undoubtedly have lower domestic prices than similar commodities abroad.

"The burden of import restriction through the tariff or other means," Professor Grady went on to say, "falls on the producers of the great agricultural commodities who must export; the shipping industry

which buys supplies and has repairs done in a protected, high-priced market and has to sell its freight service in the unprotected world market; on the mining industries whose costs are determined in a protected market and whose output is sold in a world market; and finally on the mass-production, efficient industries which have on the one hand demonstrated their ability successfully to compete abroad and who therefore need no domestic protection, but who are, on the other hand, handicapped by the higher costs which protection to the non-export industries brings about. The nature and volume of imports have a particularly important bearing on the export scope of these groups.

"The burdens which high protectionism has placed on these great groups of American business," said Professor Grady, "have resulted in such demands for relief as McNary-Haugenism for agriculture, subsidies for shipping, and Federal aid for mining. The last group has made no demands, perhaps because it

### *A*UTOMOTIVE EPIGRAMS of the Sixteenth National Foreign Trade Convention held last week in Baltimore, Md.

**Hon. Robert P. Lamont**, Secretary of Commerce: A foreign market for 140,000,000 American motor cars would be created if the 450,000,000 people of China and the 250,000,000 inhabitants of India acquired a per capita wealth comparable to that of citizens of the United States, where there is one automobile to every five persons.

**James A. Farrell**, President of the United States Steel Corporation: "Our country is far from being self-sufficient and its internal prosperity is largely influenced by the material progress of other lands and by the good will of their nationals."

**E. G. Simons**, Vice-President of the American Foreign Credit Corporation: Installment selling applied abroad would increase the buying power of our present foreign customers, and would be particularly suitable for the overseas automobile trade.

**Henry F. Grady**, Professor of International Trade and Dean of the College of Commerce of the University of California, Berkeley, Calif.: "Competition in barrier raising is like competition in armaments, it leads to international stultification."

**William Werckenthien**, President of the Island Export Company, Baltimore: The outstanding success of our automobile industry in foreign markets is a striking example of what can be accomplished through service properly given.

**David Leslie Brown**, author of "Export Advertising" and formerly manager of the advertising, sales and European departments of the Goodyear Tire and Rubber Company: "I cannot recommend a foreign advertising agency to handle an American product."

**John L. Thompson**, Credit Manager of the Yale & Towne Manufacturing Company, Stamford, Conn.: If credit insurance were available for overseas selling, it ultimately would mean hurting the sales of your present distributors in foreign countries and result in excessive bad debt losses, which in turn would so increase the cost of credit insurance as to make it prohibitive.

**Senor Don Carlos G. Davila**, Ambassador of Chile to the United States: The era of mistrust and apprehension between the Latin-American Republics and the United States has been relegated to the past by the Conference on Conciliation and Arbitration and the recent good-will tour of President Hoover, and there has opened an era of collaboration and friendship.

**Lawrence A. Downs**, President of the Illinois Central Railway System: Approximately one-fourth of the total number of motor cars exported from the United States are sold in Latin America.

**Lynn W. Meekins**, United States Commercial Attache at Ottawa, Canada: Canada should be handled as an export market.

**M. J. Falkenburg**, President of the Falkenburg Trading Company, Seattle, Wash.: "The automobile is replacing the jinrikisha in all the larger cities of Japan, and better roads are being built through the country so that it is possible to motor from Tokio to Nikko or to Yokohama and Kobe.

"One is impressed by the numerous automobiles in the principal seaport cities of China, and by the efficiency of the traffic officers and signal systems, which in some respects are as modern and more satisfactory than our own."

is able to a degree at least, as the others are not, to split its markets and get prices at home which cannot be gotten abroad. But the great mass-production industries, I believe, will some day realize that their efforts to broaden their markets through world trade are being neutralized by import restrictions, which on the one hand limit the volume of our international exchange and on the other increase the costs of production. As an example, the automobile manufacturer is in a position not essentially different from that of the wheat farmer. His sales are curtailed when his buyers find difficulty in securing dollar exchange, and his costs are increased through the relatively high prices of the tariff-protected materials he must use in manufacture. When the large export industries come to realize the burden which high protectionism is placing on them, American public opinion on import restriction may be fundamentally changed."

Speaking along similar lines on the topic of "The Business of the Sea," James A. Farrell, president of the United States Steel Corporation, stated that "Our country is far from being self-sufficient and its internal prosperity is largely influenced by the material progress of other lands and by the good will of their nationals."

"We note evidence of increasing industrial and commercial activity in other countries," said Mr. Farrell, "and sometimes we hear apprehensive comment of keener competition, but it is well to keep in mind that such increase of activity among other peoples means enlargement of their power to satisfy their own wants and desires, and that in such satisfaction will always lie opportunity for expanded sales of our own products. It is a noteworthy fact that the five or six industrial nations that are keenest competitors are also the heaviest purchasers of our products, manufactured as well as crude."

Secretary of Commerce Robert P. Lamont delivered a similar message to the convention in his address on "Prospects of United States Foreign Trade."

"The one thing most essential to the progress of our export trade is increase in buying power all over the world," said Mr. Lamont. "We cannot build it up by merely becoming more efficient nor by driving competitors out of foreign markets. When the war closed, we heard some pessimists declare that with Europe's

recovery we should lose much of the trade we had gained during the time when she was unable to supply her customary markets. Quite the contrary has

happened. The restored ability of Europe to produce and export has been a major factor in building up our exports both to Europe itself and to other parts of the world, which in turn have found their buying power increased by the ability to sell more foodstuffs and raw materials to European countries. It is to our interest that Europe should expand still further in its export of manufactured goods. The prosperity of our farmers is much affected by the prosperity of European factories. Europe itself takes more of our manufactured goods than any other continent. The increase in our sales of factory products to Europe since 1922 has been more than 60 per cent, a rate higher than appears in our trade with the world as a whole."

As an aid to the necessary expansion of export trade, William Werckenthien, president of the Island Export Company, of Baltimore, recommended "Service as a Salesman." Speaking on that subject, he

pointed out as a very striking example of what can be accomplished through service properly given "the outstanding success of our automobile industry in foreign markets, which is unparalleled in the export history of the world."

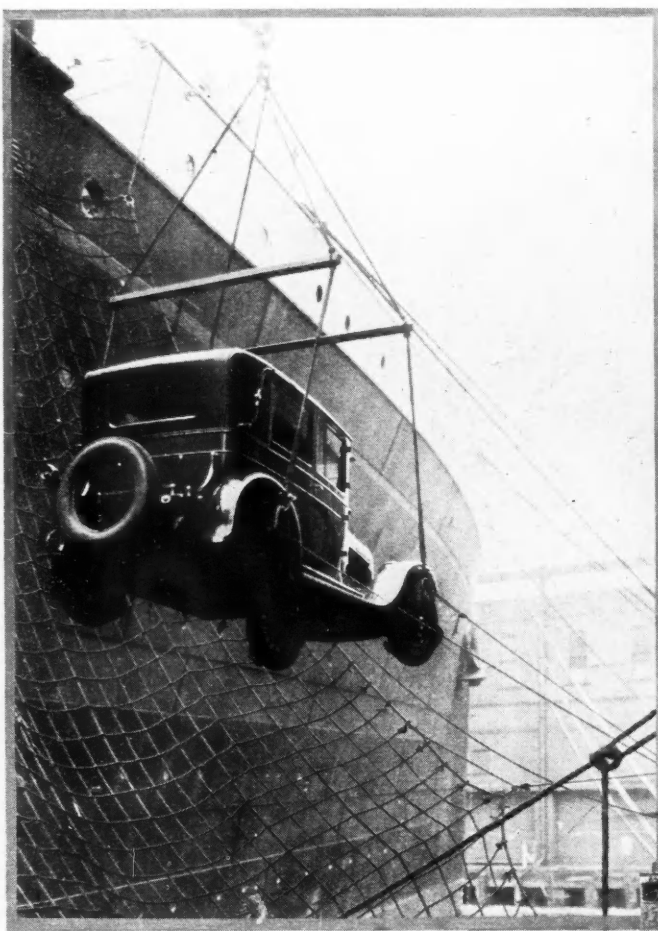
"I traveled through South America twelve years ago," said Mr. Werckenthien, "and very few American cars were in evidence at that time; mostly European cars were to be seen. Four years later, the number of American and other cars was about equal; last year, there were practically only American cars in South America, while in Europe they were to be seen in large numbers. Why this tremendous change in such a short time? Not only because of the excellent quality and pleasing appearance of our cars, but mainly because of the service that was rendered by our clever automobile manufacturers, and when I say service I do not mean mechanical service as to repairs, spare parts, etc., which of course are also essential, but principally the service or rather help that was given the foreign buyer, agent or distributor in selling his cars and placing them with the public."

Of great assistance to the foreign buyer, agent or distributor in selling his cars is advertising, it was emphasized by David Leslie Brown, author of "Export

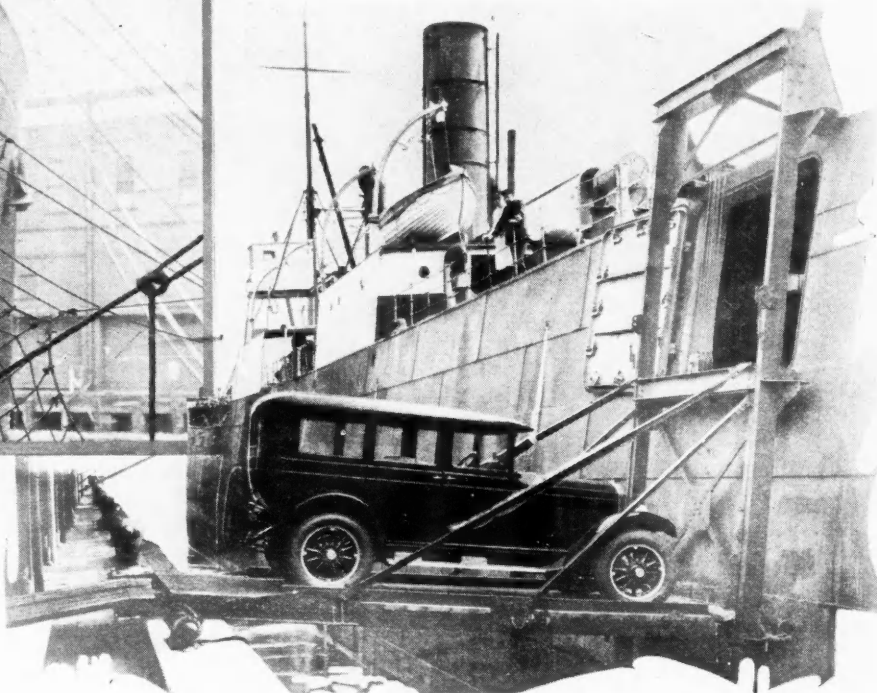


*James A. Farrell, President of the United States Steel Corporation, has been chairman since its organization of the National Foreign Trade Council, under whose auspices the Sixteenth National Foreign Trade Convention was held in Baltimore, Md., last week*





Above—Loading an automobile by hoist onto a steamer for a journey abroad. Below—A car on a special loading elevator ready to be raised to the door level and rolled aboard for shipment



stone and Fisk Tires, Palmolive, Singer, the Texas Company, Wrigley, Hoover Sweepers, Lux, Ever-sharp and Lucky Strikes.

"One thing that has struck me in traveling around," said Mr. Brown, "is the steady sweep of foreign markets by those American products that are consistently advertised much as it is done over here. Take Europe, for example. We know that they produce some things better than we do; perfumes in France, for instance, certain kinds of glassware in Italy and Czecho-Slovakia, certain linens in Ireland, and we buy their products liberally here in the United States. They know, however, that we on the other hand produce many other things better than they can. Automobiles and

Advertising" and formerly manager of the advertising, sales and European departments of the Goodyear Tire and Rubber Company, who spoke on the subject of "Advertising to Aid Foreign Distributors."

"Advertising is the fuel, the gasoline of business," declared Mr. Brown. "And the newspapers and magazines are the spark plugs. You may have the finest 'Golden Arrow' of a business machine, but it won't break any records, it won't even move, unless it has the fuel of advertising in its tanks—the power of motion."

"In export advertising, naturally, we are dealing with the world," continued Mr. Brown, "and the world is a big jig-saw puzzle; much of everything in every single piece of it is different from everything in every other piece or political or geographical unit. So, naturally, ways of doing business in the various countries differ also; and the big job of the man or firm interested in export advertising is to find out the common denominators of all the races and peoples the world over and try to base the appeal on those fundamentals that are recognized everywhere as such."

Mr. Brown named as firms that have been successful in meeting the varied requirements of foreign advertising General Motors, Chrysler, Goodyear, Fire-

tires—just to mention a few—sewing machines, typewriters, adding machines, kodaks, fountain pens, cigarettes. Yes, and soap. The biggest selling brand of soap even in France, I am fairly certain, is an American brand. But advertising, American plan, has made them know this."

European firms are endeavoring to imitate the advertising of their American competitors, according to Mr. Brown, but are not succeeding any better than those attempting there to compose the American type of jazz, or those trying to play it. Jazz, Mr. Brown said, is possibly America's best known export.

"I cannot recommend a foreign advertising agency to handle an American product," said Mr. Brown. "They simply cannot do the job justice, any more than a Viennese orchestra can properly play 'You Are the Cream of My Coffee.' It isn't in them—yet."

Possibilities of exporters obtaining satisfactory insurance on foreign sales, or for insolvency, uncollectibility at law and certain other limited risks abroad, were considered improbable by John L. Thompson, credit manager of the Yale & Towne Manufacturing Company, of Stamford, Conn.

"Even should an equitable and desirable method be found of writing credit insurance on foreign sales,"

he said, "the expense of such insurance must necessarily be out of proportion to the benefit received, as it is obvious that the expense of maintaining an insurance company with the necessary investigation is high, and probably would be as high, if not higher, than the actual bad debt experienced over a period of years by United States exporters."

An objectionable feature to credit insurance, as Mr. Thompson saw it, was that often the desire for credit insurance is to enable the insured to make sales to a customer whose standing, either as a merchant or as a credit risk, is not of high rank. Even if this desire to make sales of such a nature were not the actuating one, he said, it would result from selling goods under a credit insurance. This ultimately would break down distribution to the better merchants in foreign countries, he contended, and would result in selling goods without a profit, because of excessive losses which would necessitate a prohibitive credit insurance premium.

"To sum up briefly," said Mr. Thompson, "credit insurance in the United States is available in certain forms for domestic insurance, and is not available as a general proposition for foreign sales, but only for certain forms of insolvency. Whether it is or is not available is immaterial, as experience has shown that bad debt losses on foreign sales are less than on domestic sales. The same care and discrimination as exercised in domestic practice, used in making sales to customers in foreign countries, will enable the exporter in the United States to handle safely such sales on credit, with a very small percentage of bad debt loss, and in fact, less than his percentage on domestic sales."

Concerning market possibilities abroad, Secretary Lamont offered a rather fantastic picture when he said that a demand for 140,000,000 motor cars would be created if the 450,000,000 people of China and the 250,000,000 of India acquired a per capita wealth comparable to that of citizens of the United States, where there is one automobile for every five inhabitants. The possibility is suggested, Mr. Lamont said, by the steady progress that is being made by China and India and other so-called backward countries, as well as all other countries the world over.

Speaking in a similar vein, Senor Don Carlos G. Davila, Ambassador of Chile to the United States said:

"Calculating upon the figures of the last 50 years, one could estimate that the United States in 1978 will have 360,000,000 inhabitants; its national wealth will be more than \$1,000,000,000,000; its foreign commerce, which today is \$9,000,000,000, will have reached \$27,000,000,000 and its production of automobiles, to refer to a typically American industry, will have reached 18,000,000 cars annually, if they have not been displaced by airplanes."

The era of mistrust and apprehension between the Latin-American Republics and the United States has been relegated to the past by the Conference on Conciliation and Arbitration

and the recent good-will tour of President Hoover, the Ambassador stated, and there has opened an era of collaboration and friendship. It will give, he said, "a definite structure to the idea of continental solidarity, which only a short time ago was merely an expression in the program of international policy."

"In Chile, at least," continued the Ambassador, "we trust the United States, its government and its people, and it is not venturesome to say that the good will between the United States and the Republics of this hemisphere is well grounded already, with all the promises of mutual benefit that Secretary of State Stimson synthesized so accurately when he said only a short time ago: 'All can be done in the order of relations between peoples with good will; without good will nothing.'"

Commerce with Latin-America represents more than 22 per cent of the foreign trade of the United States, Senor Davila said, and it has been maintained during the last few years in excess of \$2,000,000,000 annually. More than 35 per cent of what Latin-America sells is purchased by the United States, according to the Ambassador, and more than 37 per cent of what the South and Central American countries buy each year comes from the United States.

Approximately one-fourth of the total number of motor cars exported from the United States are sold in Latin-America, it was stated by Lawrence A. Downs, president of the Illinois Central Railway System, in his address on "Our Commerce With the Other Americas." Despite the limited highway development thus far, the number of motor vehicles in use in Mexico and Central America more than doubled from 1924 to 1928, he said, and in South America the number more than trebled.

"I mention automobiles merely to illustrate the trend of the times in Latin-America," said Mr. Downs. "Latin-America is turning toward the United States today as this country turned toward Europe three-quarters of a century ago. The people of Latin-America need our markets as we need theirs."

"I do not know how much further we can go in increasing our domestic markets," Mr. Downs said in



Moving a car by arm-power onto a loading elevator



opening his address, "but of one thing I am fairly certain: that is that we must rely in the future more largely than we have in the past upon the expansion of our foreign markets if our producing and distributing agencies are to continue to grow, and if our country is to continue to prosper."

A similar idea was expressed by another railroad executive, Daniel Willard, president of the Baltimore & Ohio Railroad Co., in speaking on the subject "The Railroads and Foreign Trade." He said in part that "Our productive capacity was so stimulated and enlarged during the war that our own consuming capacity is not equal at the present time to our producing capacity, and therein lies a problem deserving the careful consideration of statesmen, and there are statesmen in industry as well as in the field of politics. In such circumstances the foreign market grows in importance. How to dispose of the things which we produce in excess of our own requirements is a problem worthy of the consideration of such a body as this."

Mr. Downs made another point that should be encouraging to the automotive industry from the export standpoint when he referred briefly to the movement under way to connect the Americas by means of a Pan-American highway, extending from Ottawa, Canada, and Washington, D. C., to Punta Arenas, the southern-

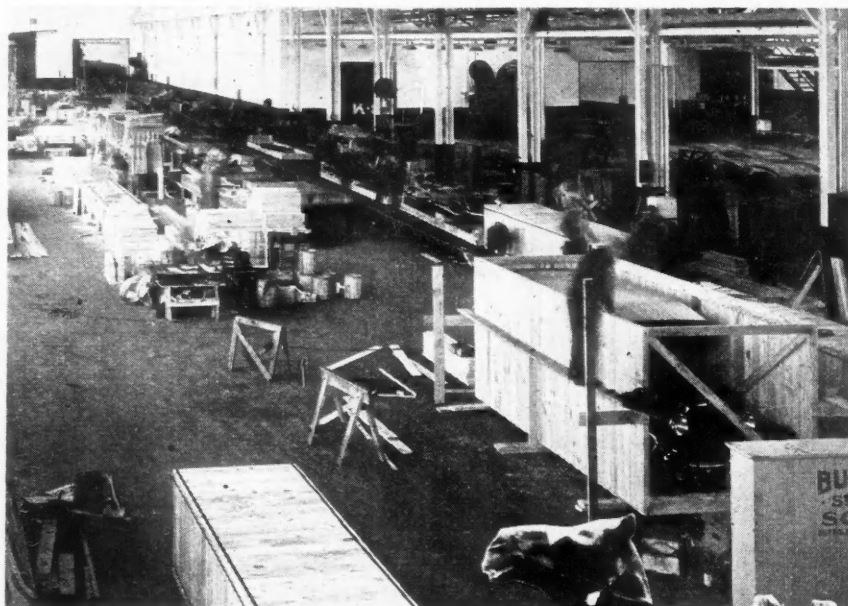
Mention of Ottawa suggests the market to the north for automobiles. With less than 10,000,000 people, Canada has well over 1,000,000 motor vehicles and 500,000 radio sets, which indicates its buying power, the convention was told by Lynn W. Meekins, United States Commercial Attache at Ottawa.

Since Canada is unique among world markets of the United States, being neither domestic nor overseas, but a contiguous export market, Mr. Meekins in his address on "Canada—Our Best Customer" advised that manufacturers before deciding upon the method of entering the Canadian market should employ the facilities offered by the five Canadian offices of the United States Department of Commerce located at Ottawa, Montreal, Toronto, Winnipeg and Vancouver.

His emphatic answer as to how Canada should be handled was "as an export market." In expressing his reasons, Mr. Meekins said that the domestic sales executive does not, as a rule, appreciate the importance of our Canadian business, and he must devote practically all of his time to the development of business in the United States. On the other hand, Mr. Meekins pointed out that the export sales executive does appreciate the importance of Canada in comparison with other export markets, and can devote as much of his time as may be necessary to the intensive development of Canadian business.

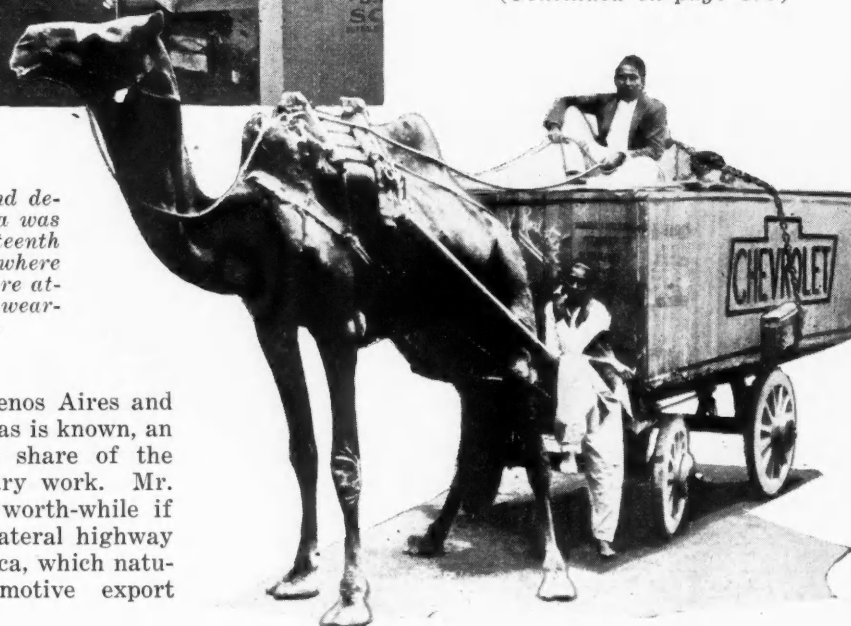
"Competition in Canada is keen," Mr. Meekins went on to say. "Great ingenuity is frequently required to market our products there. The intricacies of the Canadian tariff and customs regulations can be handled far more capably by an export executive. Canada differs from the United States in its form of government, in its laws, in its tariff, in its psychology and in the fact that it has two official languages. Successful marketing in Canada depends upon the selection of the most effective methods at the start, the right kind of approach to buyers, a modified type of advertising and continuous study of rapidly chang-

(Continued on page 673)



*Crating the automobile in Michigan and delivering it in India. Incidentally, India was not without representation at the Sixteenth National Foreign Trade Convention, where its turbaned delegate attracted even more attention in proportion than the six lei-wearing representatives from Hawaii*

most city of Chile, with branches to Buenos Aires and Rio de Janeiro. Congress recently voted, as is known, an appropriation of \$50,000 to cover our share of the expense of surveys and other preliminary work. Mr. Downs said the undertaking would be worth-while if it did nothing more than to stimulate lateral highway construction in Central and South America, which naturally should be heartening to automotive export divisions.





# Matheson Fender Process Reduces Cost By Simplifying Stamping Method

*Use of Hamilton double action toggle press, producing a pair of crowns at each operation, doubles the output of former single stamping equipment.*

By GEORGE J. MERCER

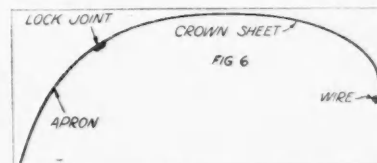
**S**IMPLIFYING manufacturing processes is an essential that is equal to, if not of more importance than, new improvements in design of motor cars. This is particularly true of the sheet metal parts which bulk large among the units that make up a car, forming the lines and shapes that delineate style.

The fabrication of the front fender has been one of the items of increasing costs accompanying the changes necessary to improve the appearance of a car while building a more rugged unit. The front fender of the design in use today requires a large sheet of metal to form it. This metal must be of high grade, deep drawing stock, extra cold rolled, to give the smooth finished surface required for lacquering and enameling. The gage of steel used by the majority of manufacturers is No. 20 (.0375), U. S. Standard.

There are two methods employed in making the front fender, one with the apron formed integral with the crown sheet as a single or complete stamping. This is called the one-piece fender. It is generally agreed that it is more expensive to make, although its use is not confined to the highest priced cars.

The other method employed in making the front fender is by the two-piece method. Apron and crown sheet are stamped out separately, and joined together with a lock-joint or seam. This will show as a crease or coach joint along the inner line of the crown sheet.

Fig. 6—Cross-section of fender completed by Matheson process, illustrating the lock-joint, wired edge and names of parts as used in this article



The Matheson process, or two-in-one method, which is the subject of this article, has to do with the making of the crown sheet for the two-piece type fender. With this new and improved process, two fender crowns, consisting of a pair, or one right and one left fender crowns, are made by one press operation that formerly required two single operations. This method is used at the present time in the Pontiac, Oldsmobile, Chrysler and Marmon plants, and the illustrations shown here were taken at the plant in Pontiac, making fenders for the Pontiac car.

There are four major press operations in making a fender crown by this method. The first is the drawing operation which is illustrated in Fig. 1. Within the press will be noticed the flat sheet of metal ready for the down press operation; at the left is a stamping just removed from the press showing two complete fender crowns in a pair. A Hamilton double action toggle press is used, having a capacity of six stampings per minute or 360 stampings per hour. These 360 stampings represent 360 pairs of fender crowns or 720 singles. Thus the output of the press has been increased by the Matheson process 100 per cent without stepping up the press operations beyond normal maximum capacity, because each stamping represents double the output over former single

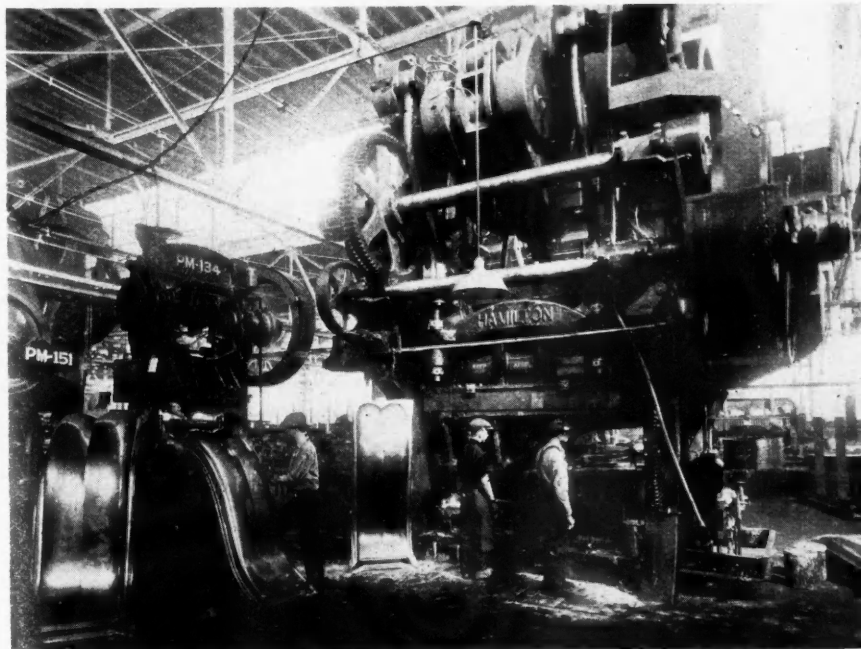


Fig. 1—Illustrating the Hamilton double action toggle press making Matheson process fender crowns

fender stamping operations, under the same conditions.

The next three operations consist of blanking, edging, or trimming the superfluous metal from the edges. In the illustration, Fig. 1, is shown the first of these, namely, trimming the front edge by means of the small press at the left of the large one in Fig. 1. As the

will equally provide for making the two crowns. It is estimated by one of the larger stamping plant executives that a saving of 2.838 lb. in metal used for hold-down is made on every pair of crowns made by the Matheson process.

This saving of 2.838 lb. per one pair of front fenders is estimated on a small car fender, a large fender will show proportionately more.

A much better stamping is made by the Matheson two-in-one method because the hold-down resistance is more equally distributed and there will be an easier flow of the metal under pressure. This has been demonstrated by the fact that fender crowns made by the single methods require frequently a hammer operation on that part of the fender extending from the run-board up to the point where the apron is attached. This operation is not required on those crowns made by the Matheson method.

A further evidence of the more even stress upon the metal by the Matheson method is illustrated in Figs. 4 and 5. Fig. 4 shows a cross-section of the dies in a press drawing a single fender crown. At A the metal is drawn to a sharp corner. This causes a heavy distortion and strain and, as a consequence, the loss from tearing and breakage is often as high as from 5 to 10 per

cent. The metal will draw thin, and, as this forms the line along which the seam or lock-joint is made when attaching the apron, there will be an inherent weakness at the place where the stress upon a fender is the greatest when in use.

In Fig. 5 is shown the condition that exists when the two fenders are drawn together by the Matheson method. At A and A the same location on the fender crown is represented as the same letter does on Fig. 4. It can be readily seen that the metal A-A on Fig. 5 is not unduly stressed as at A on Fig. 4, so that the stamping will come from the press uniform in thickness and strength. Particularly is this so at A where the seam or lock-joint is formed and the crown sheet is supported from this point. This condition relative to the local strain, along the line indicated as A, applies equally to the one-piece and two-piece fender.

stampings are removed from the large press they are picked out by an operator who takes them to the small press, edges the front and then carries them forward for the next operation. In the small press is shown a stamping ready for the operation and at the left is shown one with this edging of the front completed.

The third operation consists of splitting or separating the two crowns; there is  $\frac{1}{2}$  in. of metal allowed for this operation and this work is shown in Fig. 2. This illustration shows another large Hamilton press and operations are here performed with two sets of dies. At the left within the press is shown a double fender crown ready to be separated and the lower end edged, in a single operation. At the right, within the press, are shown two separated crowns, a right and a left, on which the edging of the outer line is performed simultaneously, while being held by the operators. At the right and left of the press are these parts as they come from the press. The presses are lined up for progressive production and the parts are not stacked or laid down to any extent.

There is also a saving or 50 per cent in the material required for hold-down by the Matheson method. This hold-down material does not enter into the finished fender make-up. It is simply excess material that is later trimmed off, its office simply being to provide a grip during the drawing operation. Therefore by forming two fender crowns at one operation of the press, the hold-down material necessary for making one fender crown by the single method,

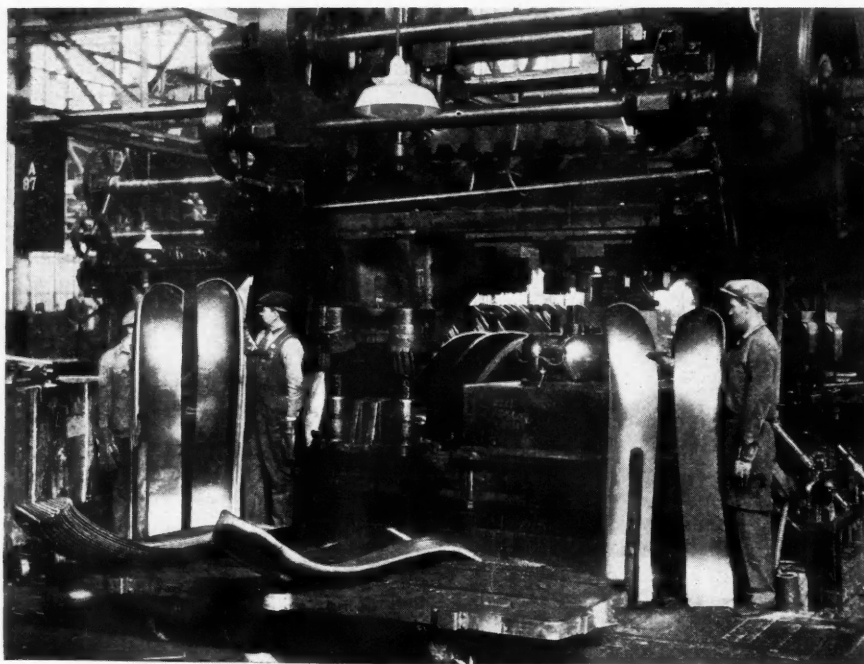


Fig. 2—View of second operation in the Matheson process, splitting or separating two crowns



Fig. 3—Assembly operation, grouped for progressive handling



As there are no new or novel features connected with the assembly operations that are different from usual practice, the several operations are grouped in Fig. 3

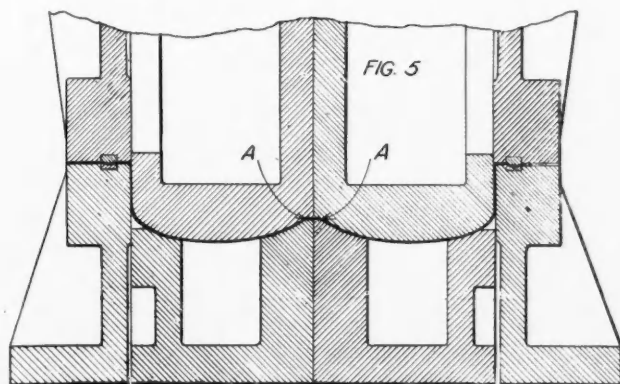


Fig. 5—Conditions existing when two fenders are drawn together by the Matheson method

and briefly described as follows: In the foreground of the illustration on the slatted rack are shown two completely assembled fenders, a right and a left. These are indicated as *B* and at *C* is shown an apron stamping going through the rolls to form the crimped edge necessary for the seam or lock-joint. *D* shows a fender crown passing through the rolls for the same purpose, while at *E* is shown the assembling of these two parts together and final locking the seam or joint by pressing between flat rolls made for the purpose. At *F* is shown the wire which extends from the bottom of the apron across the lock-joint, and along the entire outer edge of the crown sheet to the rear where it attaches to the runboard.

There operations are performed in the order in which they have been described and the machines doing the work are grouped so as to make the movement forward and progressive. In addition, there are minor operations such as spot welding the angle that is used to fasten the fender to the runboard, and attaching the supporting angle required for fastening to the car.

The Matheson two-in-one method for making crowns for the front fenders has been in operation for approxi-

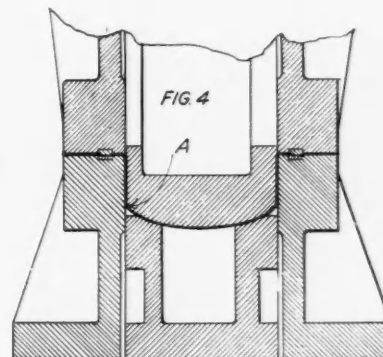


Fig. 4—Cross-section drawing of dies

mately two and one-half years and within the past year its use has materially increased. It has been proved that it effects a saving in time, in labor and material, as it stabilizes the product by preserving a uniform thickness and strength in the material, facilitates final assembly operations and, as the metal, not having been distorted, will lay more true to its stamped shape. This added faculty of saving in each step of production makes it one of the more important improvements in sheet metal operations.

## Continental Increases Bus Engine Power

A FURTHER development of its H series large bus engine is announced by Continental Motors Corp., whereby, although the engine is fundamentally unchanged, its power has been greatly increased. This has been effected by three means, the first of which is an increase in the bore from  $4\frac{1}{2}$  in. to  $4\frac{3}{4}$  in., resulting in a piston displacement of 101.89 cu. in., per cylinder and N.A.C.C. rating of 54.15 hp., as compared with 91.45, and 48.6 formerly. Next, the compression ratio has been raised from 4.16 to 4.54 to 1. In the third place, the power curve has been greatly modified by changes in the camshaft and ignition systems. This

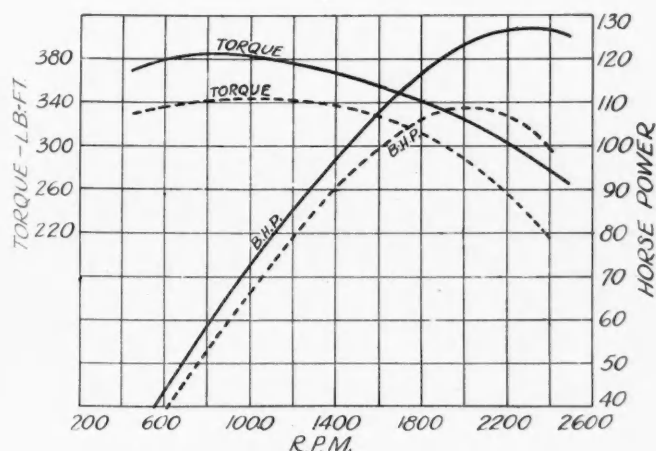
has resulted in a power peak at 2350 r.p.m. as compared with 2000 r.p.m.

Average figures show a maximum output of 127 hp. for the 16-H as compared with 105 for the 15-H. Even at the peaking speed of the 15-H the latest model develops 18 hp. more than its predecessor. The increased peaking speed is considered desirable in view of the steady increase in bus road speeds, and the desirability of not reducing gear ratios materially.

From the service angle, an improvement has been made in that the cylinder heads are now made in two castings, each covering three cylinders. This, of course, involved a change in the water outlet, and in place of a single riser, two are provided, one on each half of the head. This change should also assist in maintaining more uniform block temperatures. The built-in thermostat of the 15-H has been dropped.

Another change is in connection with the drive for the fuel pump. On the 15-H, worm gearing from the oil-pump driveshaft was provided to drive a gear or similar type pump at one-twelfth crankshaft speed. With the development of diaphragm types of fuel pump, a cam has been provided on the oil pump driveshaft, on which a finger from an AC or other fuel pump rides vertically. The fuel pump equipment, however, remains optional.

The weight of the engine (1490 lb.) is slightly higher than that of the H-15, which was 1463 lb., but as a result of new packing methods, the shipping weights have been materially decreased. For export, for instance, the crated weight is 2030 lb. as against 2130 lb. formerly.



Torque and horsepower curves of 15-H and 16-H Continental bus engines



# Tandem Axle Unit for Six-Wheel Trucks Is Offered By Timken-Detroit

*Four sizes are available for Hotchkiss and torque-tube drive.  
Although designed for original equipment, it can be used  
also for converting four-wheel trucks.*

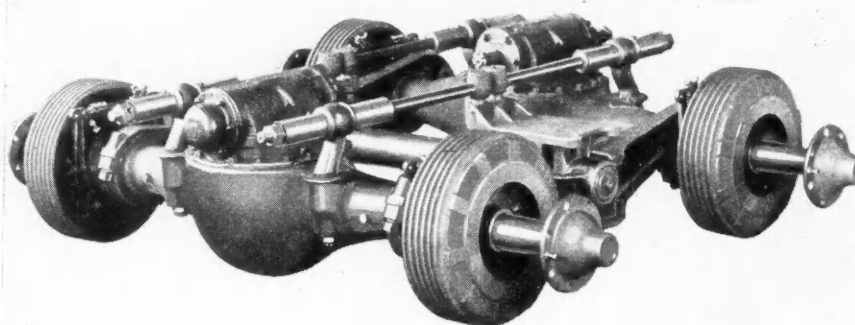
A TANDEM-AXLE, four-wheel-drive unit for six-wheel vehicles is being offered the industry by the Timken-Detroit Axle Company. While each axle of the unit is of the usual Timken design, the unit as a whole is a new product. It is intended primarily for original equipment, but can be used also for replacement of single driving axles on conventional four-wheel trucks. These SW units (as they are known) are made in four sizes all with worm drive, and they differ from standard axles in respect to the following six points:

1. The forward unit of the tandem axle has a double-ended worm, and tapers at both ends of the worm shaft.
2. The distance from the center of the axle to the driving taper is made short, to reduce the angularity of the interconnecting propeller shaft.
3. Tapers at the forward end of the front axle are made larger than those at the rear, since they transmit more power.
4. A torque-reaction device is provided.
5. Differences in the rotative speeds of the two axles are provided for without stressing the drive mechanism or slipping the tires.
6. Provision is made against a tendency of the axles to skew (wheels not following same track) or cock (twisting of springs).

The first requirement is, of course, easily taken care of. In most cases the rear axle unit will have a single ended worm, but where interchangeability is desired a double-ended unit can be supplied.

The second requirement is met by suitable design of the oil seal for the worm shaft bearings, and keeping the spacing between these bearings down to a minimum. The third is self explanatory. To meet the fourth requirement, an interesting mechanism has been worked out. It will be noted from the drawing that a load-

equalizing beam is provided between the axles; it has a trunnion mounting on the axles, and serves also to maintain the correct axle spacing. It thus forms one-half of a torque coupling.



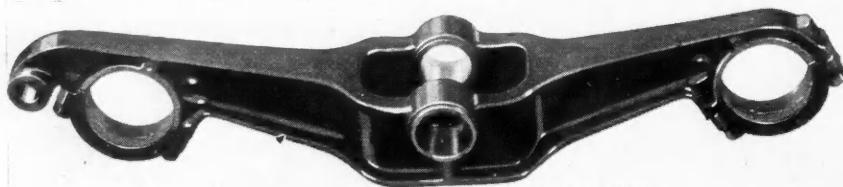
*The Timken tandem axle unit with Westinghouse airbrakes*

The other half of the torque coupling is in the form of torque rods, attached at one end to bosses provided on the axle housing and pinned at the other end to the spring seats. With this device the same torque characteristics are obtained as with a single axle. The design also makes for a self-contained unit.

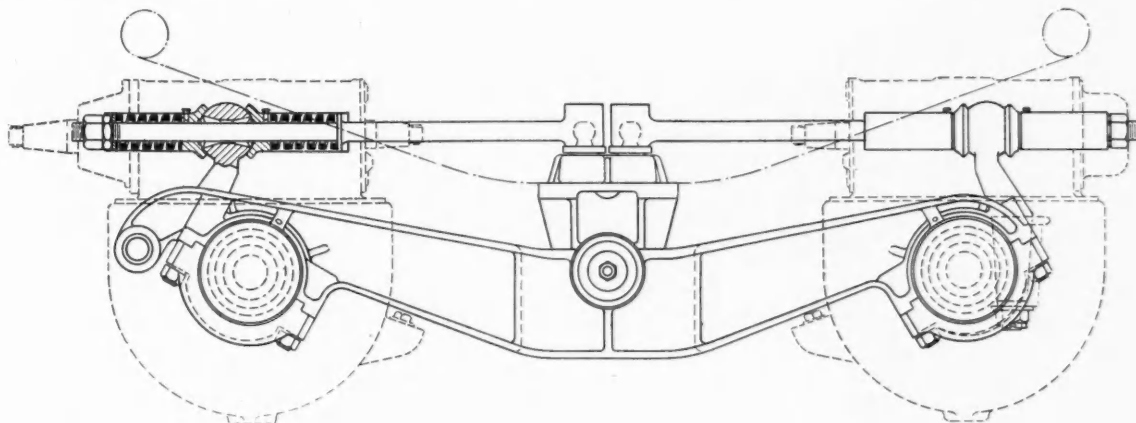
In running over rough ground, there will be differences in rotative speeds of the front and rear driving axles, and with a rigid type of construction there would be either tire slippage or undue strain on the driving mechanism. To prevent this, provision has been made in the torque rods to take care of such speed differences by making the axle mounting flexible. The torque rod itself passes through a ball forming the end of the axle torque lever. Ball followers are provided on both sides, with springs between the followers and collars or nuts on the torque rod.

In field tests of this design, about 1½ in. of travel has been noted, and it is stated that no periodicity has been encountered, although the latter could be easily controlled if it should appear.

To prevent axles skewing relative to each other, a large diameter trunnion tube is provided between them, on which the load-equalizing beam and spring pads are trunnion-mounted directly, while the torque rods are supported by it indirectly. By providing a double bearing for the spring pad on this tube, the latter also prevents cocking of axles and springs.

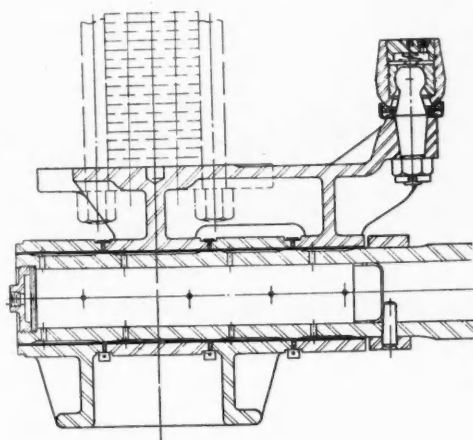


*View of load equalizing beam*



Drawing of beam and torque rods showing cushioning for speed differentials between axles

Replaceable bronze liners are used at all major bearing points. In the case of the load-equalizing beam ends, they are spherical in shape and are coin-pressed. Lubrication of these bearings is through a drilled hole



Section of trunnion tube showing lubrication control for four journals

to an oil groove in the center of the bearing. The four bearings of the trunnion tube are lubricated from a reservoir formed in the tube by a plug at the outer end, and a baffle just beyond the innermost bearing, held in place by the same pin that holds the retaining and locating collar on the trunnion tube. Bronze thrust washers are placed between the various journals to be lubricated, with seal rings over the outside.

Another difference between these axles and the regular single axles is found in the housing, which re-

quires no spring seats but must be provided with torque bosses; besides, these axles are of wider tread but lighter than single axles for trucks of the same weights.

A feature of the SW units that facilitates their installation in trucks of different designs is the wide spring pads, which permit of a considerable variation in spring centers. Universal joints between the two axles are not furnished regularly, but can be provided at the option of the purchaser. The gear ratio is made to suit the customer's requirements. Either the Hotchkiss or the radius-rod-type of drive can be used with these units, the load-equalizing beam being made with a journal at the forward end to provide for the installation of radius rods in case the springs are to be double-shackled.

#### TIMKEN TANDEM AXLES

Type No.	SW100	SW200	SW300	SW400
Max. load on four rear pneumatics .....	16,000	22,000	28,000	32,000
Max. load for solids .....	15,000	21,000	26,000	30,000
Brakes.....	Lockheed hydraulic or Westinghouse air			
Brake sizes ...	16x3½	17¼x4	17¼x4	17¼x4
Spring centers..	39-41-43	41¾-43¾-45¾	42-44-46	42-44-46
Axle spacing ...	46	46	46	46
Frame width ...	32-34-36	34-36-38	34-36-38	34-36-38
Spring width ...	¾	¾	4/5	4/5
Track .....	71	75 13/16	75	75
Dual wheel spacing .....	9¾	10½	11¼	11¼

### New 3-Ton Diamond T Chassis In Production

THE Diamond T Motor Car Co. of Chicago is in production on a new 3-ton chassis especially designed for high-speed, heavy-duty service. It is equipped with a Hercules six-cylinder 4¾ by 4¾-in. engine developing 93.5 hp. at 2200 r.p.m., a seven-speed transmission, vacuum-operated hydraulic four-wheel brakes and 36 by 6-in. pneumatic tires, dual at the rear.

This Model 600 is offered in wheelbase lengths of from 145½ in. for tractor use to 224½ in. for a body 20 ft. long behind the cab. Fuel feed is by gravity from a seat tank and an option is given on extra tanks mounted at the side of the frame, with vacuum feed. The power is transmitted through a Covert multiple disk clutch to a Brown-Lipe two-range transmission mounted amidships.

With a 6 to 1 ratio a top speed of 40 m.p.h. at 1800

r.p.m. of the engine can be maintained. Final drive is through a Timken worm drive rear axle.

Lockheed internal hydraulic brakes are employed in the front wheels, while Timken Duplex hydraulic brakes, operated from the same master cylinder, are used at the rear. Foot power is supplemented by a B-K vacuum booster, which is trunnion-mounted at the rear of the master cylinder.

A heat-treated chrome nickel steel frame, reinforced by steel side plates, is employed. It incorporates six cross-members, two of which are tubular. Springs are semi-elliptic and alloy steel.

Standard equipment includes generator, starter, battery, head and tail lights, a chromium-plated spring bar bumper, a governor, an oil filter, an air cleaner, a speedometer, a horn, a spare wheel, and a tire carrier.

# American Passenger Cars Are Assembled In 155 Plants Throughout the World

*Michigan, as might be expected, leads with 20 plants, of which 13 are in Detroit, and all of which are engaged in both the manufacture and assembly of vehicles.*

By A. B. CROFOOT

AMERICAN manufacturers of automobiles are today assembling passenger cars in 155 plants scattered throughout the world. Of these plants, 87 are located within the United States and 68 abroad.

For the purpose of this discussion, an assembly plant is arbitrarily taken to mean any plant where a completed automobile leaves the plant under its own power. This list, therefore, includes plants where the car is completely built from the ground up as well as plants where motors, chassis units and bodies are received from other plants and assembled into completed cars.

Before proceeding further with the classification, it might be well to clear up another definition because the practice of the industry, at least when it comes to giving out production figures, varies somewhat on this point. While it is the practice of many manufacturers to include Canadian production in their periodic reports of production figures, Canadian assembly plants are considered as foreign plants just as much as European plants and Australian plants are so considered.

The accompanying tables show a number of interesting facts about the distribution of these automobile plants and their classification. Considering first domestic plants, it is interesting to note that Michigan, as might be expected, leads the list with 20 plants, of which 13 are located in Detroit. Incidentally, it will be further noted from Table III that all of the Michigan plants are engaged in both manufacture and assembly.

Ohio comes second in the total number of assembly plants but Indiana is second in the list of states having plants where both manufacture and assembly take place. Whereas Ohio has a total of 11 plants, seven of these are devoted to both manufacture and assembly with four devoted exclusively to assembly operations. Indiana, on the other hand, with a total of nine plants, has eight plants in which both manufacture and assembly take place. California leads in the list of strict assembly plants with five such plants within her borders.

The actual production of automobiles where both manufacture and assembly take place is limited to eight states, but automobiles are assembled in 28 states out of the 48. Tables II, III and IV bring these points out very clearly.

As the plants listed in these tables include only such plants as finally assemble cars, they cannot be considered in any sense as including all plants con-

tributing to automobile manufacture. A number of the manufacturers have other plants carrying on manufacturing operations which are not included. Hupp, for example, has a plant in Jacksonville which operates as a machine shop only. Ford has several parts plants where cars are not assembled, Chevrolet has manufacturing operations in Detroit, Bay City and Saginaw, Mich., and at Toledo, Ohio, at none of which places are finished cars assembled.

Chrysler, in addition to its four assembly plants in Detroit, has a fifth plant devoted entirely to the making of bodies and also an experimental plant. In addition to its assembly plant in Milwaukee, Nash also has a body plant in that city and has a plant in Pine Bluff, Ark., devoted to the manufacture of dimension lumber. Other manufacturers also have separate body plants which are not included in this list.

Assembly operations carried on abroad also show some interesting facts. Australia, for example, has the largest number of assembly plants for American automobiles of any one country, while Canada runs a close second, with nine plants to Australia's eleven.

Strictly speaking all of the foreign plants, with the exception of Ford's Manchester plant in England, can be classified as assembly plants only. It is noteworthy, however, that both Ford and General Motors have adopted the policy of purchasing as much as possible of the material necessary for building their cars as near their assembly plants as is feasible.

The majority of the overseas plants, are, of course, the properties of Ford or General Motors, although Chrysler, Durant, Graham-Paige, Hudson, Hupp, Willys-Overland and Studebaker also maintain plants either in Canada, Europe or Australia. So far General Motors and Ford are the only ones who have established assembly operations in Asia.

General Motors' assemblies at its foreign plants include Chevrolet, Oakland, Pontiac, Oldsmobile and Buick cars. Such Cadillacs, LaSalle and, for the present, Vikings as are required for the export market are shipped abroad as completed cars.

Both General Motors and Ford have warehouse operations abroad in addition to these assembly operations. General Motors, for example, has warehouse operations in Paris, France; Madrid, Spain, and Alexandria, Egypt. Ford has similar stations in Porto Alegre, Brazil; Puerto Cabello, Venezuela, and Shanghai, China. Then, of course, as is well known, Ford has a large plant in Cork, Ireland, which is now devoted largely to the manufacture of Fordson tractors.



There is in Danzig, Poland, a Hudson distributor who operates his own assembly unit for Hudson and Essex cars shipped from this country in unassembled units. Hudson is also erecting an assembly plant in Antwerp, Belgium, which should be in operation some time this year.

Willys-Overland also maintains 18 stations throughout the world which might be classified as partial assembly plants where cars are unboxed and such parts as are removed for shipment are replaced before delivery to the distributors in these various countries.

The Vauxhall plant in England and the Opel plant in Germany, both properties of General Motors, are not included in the list of General Motors overseas operations as they manufacture local cars and do not assemble American cars for their respective markets, at present at least. This condition, however, raises an interesting question as to possible future developments in the actual manufacture abroad of cars of American design for sale in the foreign market. This question, however, does not properly belong here, but calls for more lengthy discussion at some other time.

## Location of American Assembly Plants Throughout the World

TABLE I

Manufacturer	Domestic	Location	Foreign	Location
Auburn .....	3	Auburn, Ind. Connersville, Ind. Indianapolis	0	
Buick .....	1	Flint, Mich.	(Duesenberg) (See G.M.)	
Cadillac-LaSalle .....	2	Detroit	0	
Chevrolet .....	9	Flint, Mich. North Tarrytown, N. Y. St. Louis, Mo. Oakland, Cal. Janesville, Wis. Norwood, Ohio Buffalo, N. Y. Atlanta, Ga. Kansas City, Mo.	(See G.M.)	
Chrysler-Dodge .....	4	Detroit, Mich.	5	Windsor, Ont. Berlin, Germany Antwerp, Belgium London (2)
Cunningham .....	1	Rochester, N. Y.	0	Paris (1)
Davis .....	1	Richmond, Ind.	0	
De Soto (See Chrysler)				
Dodge (See Chrysler)				
DuPont .....	1	Wilmington, Del.	0	
Duesenberg (See Auburn)				
Durant .....	2	Lansing, Mich. Oakland, Cal.	2	Berlin, Germany Toronto, Canada
Elcar .....	1	Elkhart, Ind.	0	
Erskine (See Studebaker)				
Essex (See Hudson)				
Ford .....	32	Atlanta, Ga. Buffalo, N. Y. Charlotte, N. C. Chester, Pa. Chicago, Ill. Cincinnati, Ohio. Cleveland, Ohio Columbus, Ohio Dallas, Tex. Denver, Col. Des Moines, Iowa Detroit, Mich. Houston, Tex. Indianapolis, Ind. Jacksonville, Fla. Kansas City, Mo. Kearney, N. J. Los Angeles, Cal. Louisville, Ky. Memphis, Tenn. Milwaukee, Wis. New Orleans, La. Norfolk, Va. Oklahoma City, Okla.	31	Antwerp, Belgium Asnieres (Seine), France Barcelona, Spain Berlin, Germany Buenos Aires, Argentine Copenhagen, Denmark Manchester, England Mexico City, Mexico Rio de Janeiro, Brazil Santiago, Chile Sao Paulo, Brazil Yokohama, Japan Alexandria, Egypt Havana, Cuba Helsingfors, Finland Lima, Peru Montevideo, Uruguay Pernambuco, Brazil Rotterdam, Holland Stockholm, Sweden Trieste, Italy Winnipeg, Manitoba, Canada Toronto, Ontario, Canada Montreal, Quebec, Canada

Manufacturer	Domestic	Location	Foreign	Location
		Omaha, Neb.		Bombay, India
		Pittsburgh, Pa.		Geelong, Australia
		Portland, Ore.		Brisbane, Australia
		St. Louis, Mo.		Sydney, Australia
		San Francisco, Cal.		Adelaide, Australia
		Seattle, Wash.		Perth, Australia
		Somerville, Mass.		Port Elizabeth, South Africa
		Twin City, Minn.		
Franklin .....	1	Syracuse, N. Y.	0	
Gardner .....	1	St. Louis, Mo.	0	
General Motors (including Chevrolet, Buick, Oakland, Olds and Pontiac)	(See individual companies)		21	London, England
				Copenhagen, Denmark
				Stockholm, Sweden
				Antwerp, Belgium
				Berlin, Germany
				Warsaw, Poland
				Buenos Aires, Argentina
				Sao Paulo, Brazil
				Montevideo, Uruguay
				Port Elizabeth, South Africa
				Adelaide, Australia
				Brisbane, Australia
				Melbourne, Australia
				Perth, Australia
				Sydney, Australia
				Wellington, New Zealand
				Osaka, Japan
				Batavia, Java
				Bombay, India
				Walkerville, Ontario, Canada
				Oshawa, Ontario, Canada
				Also has warehouse operators, Alexandria, Madrid, Paris
Graham-Paige .....	1	Detroit, Mich.	1	Berlin, Germany
Hudson .....	1	Detroit, Mich.	2	London, England
				Berlin, Germany
				(Also erecting one in Antwerp, Belgium, and Danzig, Poland, distributor operates one)
Hupp .....	3	Detroit, Mich. (1) Cleveland, Ohio (2)	1	Windsor, Ont., Can.
Jordan .....	1	Cleveland, Ohio	0	
Kissel .....	1	Hartford, Wis.	0	
LaSalle (See Cadillac)				
Lincoln .....	1	Detroit, Mich.	0	
Locomobile .....	1	Bridgeport, Conn.	0	
Marmon .....	1	Indianapolis, Ind.	0	
Moon, Diana and White Prince .....	1	St. Louis, Mo.	0	
Nash .....	3	Kenosha, Wis.	0	
		Racine, Wis.		
		Milwaukee, Wis.		
Oakland-Pontiac .....	1	Pontiac, Mich.		See G.M.
Oldsmobile .....	1	Lansing, Mich.		See G.M.
Overland .....	2	Toledo, Ohio	2	Manchester, England
		Los Angeles, Cal.		Berlin, Germany
				(Also maintains 18 so-called partial assembly plants)
Packard .....	1	Detroit, Mich.	0	
Peerless .....	1	Cleveland, Ohio	0	
Pierce-Arrow .....	1	Buffalo, N. Y.	0	
Plymouth (See Chrysler)				
Pontiac (See Oakland)				
Reo .....	1	Lansing, Mich.	0	
Roamer .....	1	Kalamazoo, Mich.	0	
Stearns .....	1	Cleveland, Ohio	0	
Studebaker .....	2	South Bend, Ind.	2	Walkerville, Ontario, Canada
		Detroit, Mich.		Sydney, Australia
Stutz-Blackhawk .....	1	Indianapolis, Ind.	0	
Viking (See Oldsmobile)				
Willys-Knight .....	1	Toledo, Ohio	0	

## Plant Distribution By Cities and States

TABLE II

ASSEMBLY ONLY		COMBINED MANU- FACTURING AND ASSEMBLY	
		Cities	
Atlanta, Ga.	2	Detroit, Mich.	13
Buffalo, N. Y.	2	Cleveland, Ohio	5
Kansas City, Mo.	2	Indianapolis, Ind.	3
Los Angeles, Cal.	2	Lansing, Mich.	3
Oakland, Cal.	2	Flint, Mich.	2
St. Louis, Mo.	2	Toledo, Ohio	2
Charlotte, N. C.	1	St. Louis, Mo.	2
Chester, Pa.	1	Auburn, N. Y.	1
Chicago, Ill.	1	Bridgeport, Conn.	1
Cincinnati, Ohio	1	Buffalo, N. Y.	1
Cleveland, Ohio	1	Connersville, Ind.	1
Columbus, Ohio	1	Elkhart, Ind.	1
Dallas, Tex.	1	Hartford, Wis.	1
Denver, Colo.	1	Kalamazoo, Mich.	1
Des Moines, Ia.	1	Kenosha, Wis.	1
Houston, Tex.	1	Milwaukee, Wis.	1
Indianapolis, Ind.	1	Pontiac, Mich.	1
Jacksonville, Fla.	1	Richmond, Va.	1
Janesville, Wis.	1	Rochester, N. Y.	1
Kearney, N. J.	1	So. Bend, Ind.	1
Louisville, Ky.	1	Syracuse, N. Y.	1
Memphis, Tenn.	1	Wilmington, Del.	1
Milwaukee, Wis.	1		
New Orleans, La.	1	Total	45
No. Tarrytown, N. Y.	1		
Norfolk, Va.	1	States	
Norwood, Ohio	1	Michigan	20
Okla. City, Okla.	1	Indiana	8
Omaha, Neb.	1	Ohio	7
Pittsburgh, Pa.	1	New York	3
Portland, Ore.	1	Wisconsin	3
Racine, Wis.	1	Missouri	2
San Francisco, Cal.	1	Connecticut	1
Seattle, Wash.	1	Delaware	1
Somerville, Mass.	1		
Twin Cities, Minn.	1	Total	45
Total	42		

## Cities Having More Than One Plant

TABLE IV

Cities	Manufr. and Assembly	Assembly Only	Total
Detroit	13	0	13
Cleveland	5	1	6
Indianapolis	3	1	4
St. Louis	2	2	4
Buffalo	1	2	3
Lansing	3	0	3
Atlanta	0	2	2
Flint	2	0	2
Kansas City	10	2	2
Los Angeles	0	2	2
Milwaukee	1	1	2
Oakland	0	2	2
Toledo	2	0	2

## Comparison of Distribu- tion by States

TABLE III

States	Manufr. and Assembly	Assembly Only	Total
Michigan	20	0	20
Ohio	7	4	11
Indiana	8	1	9
Missouri	2	4	6
New York	3	3	6
Wisconsin	3	3	6
California	0	5	5
Georgia	0	2	2
Pennsylvania	0	2	2
Texas	0	2	2
Connecticut	1	0	1
Delaware	1	0	1
Colorado	0	1	1
Florida	0	1	1
Illinois	0	1	1
Iowa	0	1	1
Kentucky	0	1	1
Louisiana	0	1	1
Massachusetts	0	1	1
Minnesota	0	1	1
Nebraska	0	1	1
New Jersey	0	1	1
North Carolina	0	1	1
Oklahoma	0	1	1
Oregon	0	1	1
Tennessee	0	1	1
Virginia	0	1	1
Washington	0	1	1

## Distribution By Continent and Countries

TABLE V

Countries	Continents
Australia	11
Canada	9
Germany	7
England	6
Brazil	4
Belgium	3
Argentina	2
Denmark	2
France	2
India	2
Japan	2
So. Africa	2
Sweden	2
Uruguay	2
Chile	1
Cuba	1
Egypt	1
Finland	1
Holland	1
Italy	1
Java	1
Mexico	1
New Zealand	1
Peru	1
Poland	1
Spain	1
Total	68



# Use of Electrical Pressure Indicators Limited in Automotive Tests

*Methods have various shortcomings which may militate against their application to general testing of engines.*

By K. J. DE JUHASZ

Engineering Experiment Station, State College, Pa.

IN view of the numerous proposals which have been made recently for the measurement of high frequency pressure variations, such as occur in internal-combustion engines, by electrical methods, the following remarks may be of interest.

The error  $E$  (i. e., the difference between the recorded pressure and the true pressure) with which a pressure measuring instrument having a moving mass  $m$  and a displacement  $C$  per unit of pressure is capable of recording a given pressure variation, the time rate of which is  $dp/dt$ , can be expressed by the equation:

$$E = \frac{dp}{dt} \sqrt{m C}$$

Reduction of this error, therefore, resolves itself into diminishing  $m$  or  $C$  or both. That means that the measuring instrument must be built with a small moving mass and a small displacement. This requirement is clearly recognized, and both measures are widely used in pressure-indicator design.

It is necessary to magnify the small displacements of the pressure measuring element in order to make them observable and recordable. Various methods of magnification have been suggested and embodied in numerous indicating devices, as follows:

1. Microscopical observation of a record of small dimensions (micro indicators).
2. Optional magnification with light ray, equivalent to a long lever without mass) and photographic recording (optical indicators).
3. Electrical methods.

It is intended to deal in this article only with the last group.

The electrical methods consist essentially in measuring and recording the change in a continuous or alternating electric current flowing in a circuit, whose

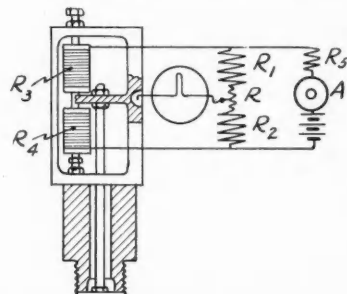
(a) resistance; (b) impedance; (c) capacity

is altered by the minute displacement of the pressure-measuring element.

Owing to the high state of electrical measuring technique, all kinds of non-electrical magnitudes can be measured if they can be translated into electrical terms, and provided that this translation is consistent and free from error in itself. For this reason, the electrical method appears at first sight a tempting solution of the problem of measuring high frequency pressure variations.

An application of method *a* is found in the electrical engine indicator developed by E. J. Martin and D. F. Caris, who described it in a paper entitled "A New Electrical Engine Indicator" that was published in the

Fig. 1b—Diagram of the pressure element of the Martin and Caris electric engine indicator

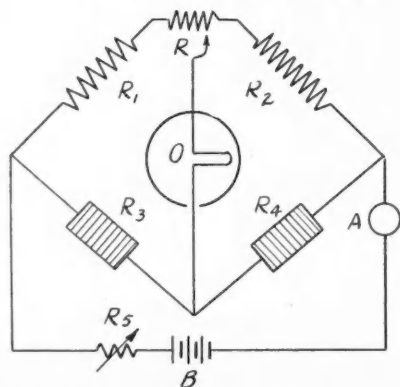


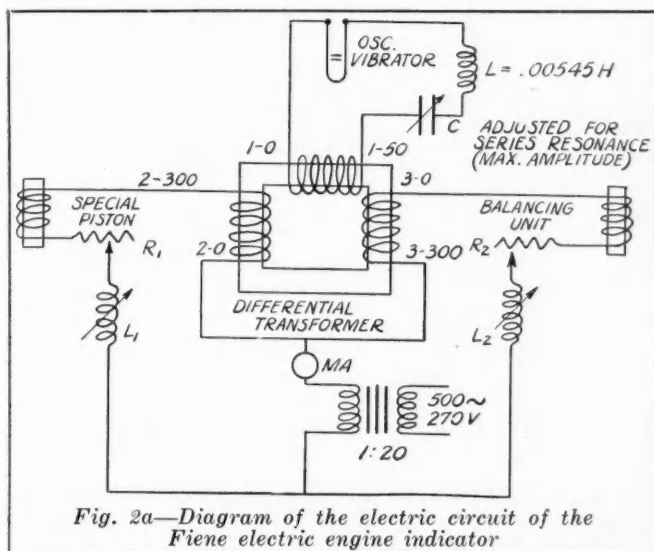
Journal of The Society of Automotive Engineers for July, 1928. The principle of the instrument is illustrated in Fig. 1. It consists essentially of a Wheatstone bridge in which are incorporated two carbon-pile rheostats, the resistance of which is varied by the pressure acting on them and the consequent minute displacement of the carbon disks. The bridge current is recorded by an oscillograph.

An example of the application of method *b* is the indicating device developed by M. E. Fiene for testing a high-speed compressor (see: *Electrical Method of Obtaining Indicator Cards of a Compressor, Refrigerating Engineering*, March, 1928). The scheme is shown on Fig. 2, the apparatus consisting essentially of a transformer with two differentially connected windings. One winding is connected in circuit with a coil built into the moving piston of the compressor. The impedance of this coil is varied by the pressure acting on, and the consequent displacement of, a steel diaphragm forming part of the magnetic circuit of the coil. The difficulties of electrically connecting the coil in the moving piston with the rest of the apparatus (which is at rest) were overcome by ingenious means, and a series of interesting cards were obtained.

An example of the application of method *c* is the electrical indicator developed by Juichi Obata (see:

Fig. 1a—Diagram of the electric circuit of the Martin and Caris indicator, which is treated in conjunction with Fig. 1b





An electrical Indicator for High-Speed Internal-Combustion Engines, *Engineering*, Aug. 26, 1927). The principle of this instrument is shown diagrammatically in Fig. 3. An electric condenser forms part of an oscillating system. The capacity of the condenser is varied by the pressure on, and the consequent displacement of, a metal diaphragm which forms one of the plates of the condenser. The resulting changes in the voltage can be amplified by thermionic valves, and finally observed and recorded by means of a string galvanometer, string electrometer or (preferably) a Duddel oscillograph. Related to this method is the recent suggestion of Norman J. Thompson in *Automotive Industries* of March 23, 1929, that instantaneous pressures may be measured by radio.

Fascinating as the electric methods seem to be for the purpose of indicating high speed engines, they have important shortcomings which militate against their use in automotive engine testing in general. These are:

1. Delicacy as regards unskilled handling. Their use, therefore, ordinarily cannot be entrusted to the hands of a motor mechanic; highly skilled electrical experts are needed for their operation.

2. Need for frequent calibration, because the diaphragms (or other pressure-measuring elements) change their mechanical properties under the influence of heated gases, oil and moisture, to which they are ex-

posed. A further source of error is introduced by the distortion of the photographic records while being developed.

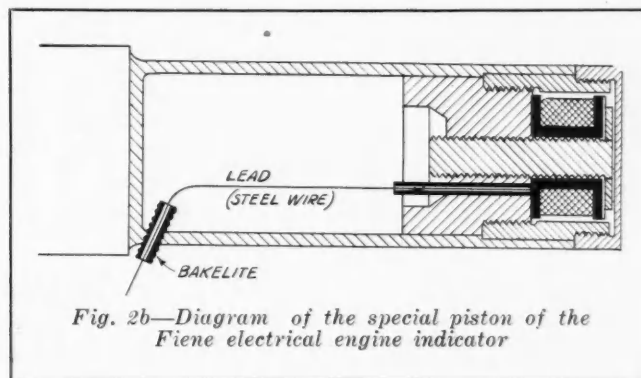
3. Inconvenience and cost of the photographic recording.

4. The records obtained are pressure-time cards; their transformation into pressure-volume cards—which are generally required—is a laborious process and introduces a further source of error.

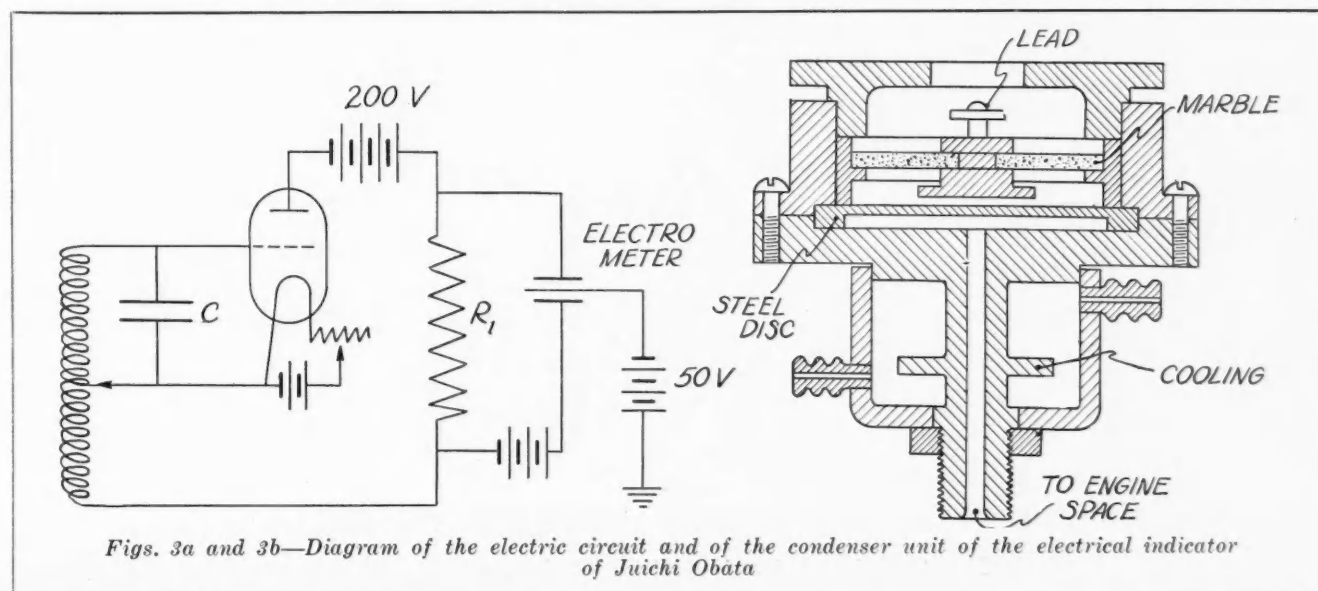
5. The equipment is usually of great bulk, which is not easily located in a testing room. The initial cost is high, and to this is added the cost of replacements, which may be quite frequent in view of the delicate nature of some of the instruments which form part of the outfit.

Coming back to our initial equation of the error, all the difficulties of indicating disappear and the inertia error can be eliminated if the time-rate of pressure variation,  $dp/dt$ , which acts upon the pressure-measuring element, is made of low value.

This seeming paradox can be accomplished where pressure phenomena, that recur periodically in the same form, are to be investigated. The pressure cycles in high-speed engines belong to this group of phenomena.



The writer's high-speed indicator accomplishes this result by interposing between the engine space to be tested and the cylinder space of a normal slow-speed indicator a valve element which is positively actuated by the engine itself. Communication between the two spaces is established during the same phase of each cycle for the duration of a small fraction of the complete cycle. Thus the pressure-measuring element is



subjected virtually to a constant pressure. By varying the phase of communication the pressures of the complete cycle can be recorded with a practically complete elimination of the inertia error.

It is interesting to observe that the principle of this indicator is the mechanical analogy of the contact disk (Joubert disk), an instrument widely used in alternating current testing practice.

The advocates of the electrical (and also those of the optical) indicators aim to record one single cycle only. As a matter of fact, for most purposes, a mean card, composed from numerous cycles, is just as usable, or even preferable. It has to be pointed out, however, that for the recording of non-recurring, i. e., transient phenomena, such as single explosions in a cannon, a rifle, or a laboratory bomb, or the like, the point-to-point method is not applicable and recourse has to be had to optical or electrical methods.

## Mack Builds New City Bus Bodies

**V**IEW of the new and improved city type bus bodies for use with either four or six-cylinder chassis now being built by Mack Trucks, Inc., is pictured below. In the new bodies, known as the CI type, Mack has catered to the modern trend which demands beauty with utility. The new bodies retain all the rugged construction characteristic of previous Mack bus bodies, but at the same time they present a modern appearance due to a harmonious streamline effect, which is further accented by the lower belt line extending the full length of the chassis in a straight and unbroken line.

Among the other characteristics which give the new bodies a distinctive appearance is the integral skirt of unit parts construction. The rub rail has been eliminated, and the doors are equipped with concealed door hinges and smooth panels. Improved destination sign, and new type of ventilators are also features of the new bodies. Spare tires are carried beneath the chassis instead of at the rear, allowing for greater body overhang without increasing overall overhang.

The cowl has been considerably shortened and the steering is placed outside the frame and well forward, so that the driver is seated in the left forecorner of the body as compactly as is practicable for proper driver freedom, and also providing more room for standees.

The interior of the new bodies is also designed to give that appearance and feeling of comfort which bus riders have grown accustomed to since the inauguration of the parlor car bus. The new Mack city type buses have

smooth, wide ceilings, large aisle space, remarkably clear and unobstructed vision, yielding leather covered seats, flexolith flooring, close-fitting advertising car rack, and a convenient passenger signal system. They are built to accommodate both 29 to 37 passengers and their width of 96 inches insures the maximum of riding comfort for standees. This riding comfort is further enhanced by the use of Mack rubber shock insulators at all points of spring suspension.

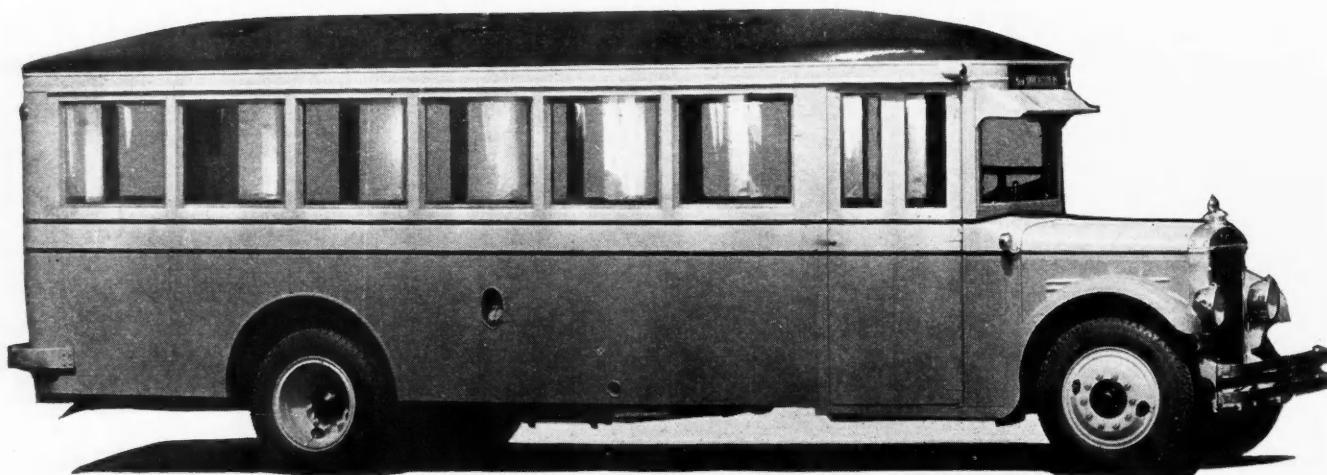
## U-Tube Pressure Gages

**S**OME interesting points on the U-tube pressure gages were given in a recent talk by D. C. Beckett, secretary of the Meriam Company, Cleveland, Ohio. One of the advantages of the U-tube gage is that indications depend directly upon unchanging physical laws, instead of upon the properties of such elements as diaphragms and springs, which are subject to change with time. Moreover, since its action is differential, it is practically independent of inaccuracies in the "bore" of the glass tube. For this reason the U-tube gage is used to check the accuracy of other pressure measuring instruments. The accuracy of the gage depends upon the U bend being free from restrictions. It is also necessary that the tube be pressure-tight, for even a slight leak would produce great errors in the readings and would be decidedly dangerous if the tube were used for high pressures.

The tubes are made from a special lead glass which can be bent at a comparatively low temperature. Bending of the tube so the two legs will be exactly parallel and so there will be no constriction at the bend calls for considerable skill. After bending, the tube is laid in the case, resting upon a series of cork-mounted holder clips, and its ends are pushed into orifices provided in the case, and made pressure-tight. The clips are then closed over the tube and the instrument is ready for testing.

Where the gage is to be used for measuring very high pressures, from 300 to 1000 lb. p. sq. in., on account of the tendency of the internal pressure to force the ends of the tube apart and also because of the risks involved, the bend of the tube is imbedded in litharge cement which is rigidly anchored by means of screws projecting into it from the metal base.

It is generally desirable to have the manometer scale so made that it gives directly the value of the quantity to be measured, thus avoiding the necessity of multiplying by a "constant" in order to get the information desired.



*New Mack Bus designed especially for city transportation*



# New Dodge Half-Ton Express Chassis is Priced at \$545

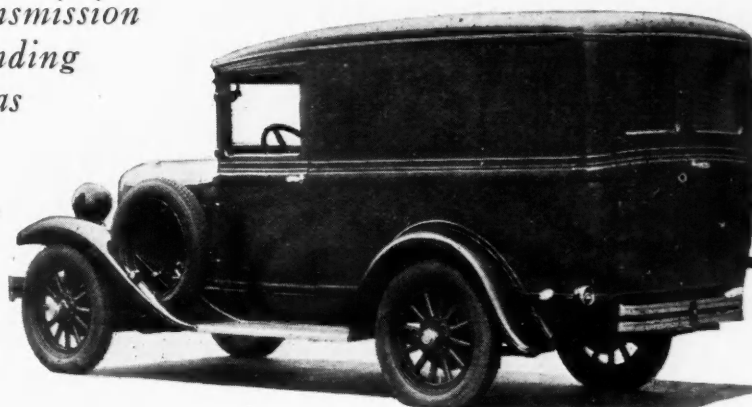
*Truck has standard three-speed transmission  
and four-wheel internal expanding  
hydraulic brakes. Frame has  
four cross members*

A NEW ½-ton Merchants Express is announced by Dodge Brothers Corp. Listed at \$545 f.o.b. it is the lowest priced chassis ever offered by the Dodge organization for commercial use. It is already in production and initial shipments have been made.

Featuring the new model is the attractive panel body illustrated on this page. Exterior finish is blue with cream wheels and black hubs and fenders. Body interiors are finished in grey lacquer. Price of the panel body unit complete is \$795. Interior length is 72 in. with 45½-in. interior width and 50-in. body height. While figures on loading height are not available, this appears to be exceptionally low. The chassis is also available without body for locally built body installation.

Of the mechanical units, the four-cylinder engine has a bore and stroke of 3⅝ by 4¼ in. giving it a piston displacement of 175.4 cu. in., a rating of 21.03 N.A.C.C. hp. and a peak of 45 hp. at 2800 r.p.m. A final reduction of 4.7 to 1 gives an engine speed of 1650 r.p.m. at 30 m.p.h., indicating good performance and power characteristics. Compression ratio is 4.6 to 1.

A three-bearing 41-lb. crankshaft, 8 13/16 in. long connecting rods, aluminum alloy pistons, L-head valve arrangement, steel flywheel ring gear, rubber engine mountings and a water pump are further features of the powerplant. The water pump is located on the opposite side of the cylinder block from the generator and is driven by the same belt which drives the fan and generator. This belt is adjustable at the generator mounting. The fan is of the two-bladed type, 17 in. in diameter, and the water capacity should be ample with 3½ gal. for the system. Electric units



*New Dodge Commercial Express*

are Delco-Remy with semi-automatic spark advance and Bendix starter engagement.

Timken taper roller bearings are used throughout in the rear axle and also for the front wheel bearings. The front axle has reverse Elliott ends with ¾-in. inside diameter king pin bushings, the upper being 1 3/32 and the lower 1 15/32 in. long. Drag links are tubular rather than solid for greater strength with less weight, and floating ball socket joints for absorbing road shocks to the drag link mechanism are provided. Steering gear is of the worm and sector type.

Four-wheel internal expanding hydraulic brakes with 11-in. drums, 1½ in. wide are supplemented by an independent emergency brake on the propeller shaft having a 7-in. drum and 2-in. band width. Tires are 4.75/20 six-ply on 20-in. wood wheels. Wheelbase is 109 in.

Four cross-members are provided in the pressed steel channel type frame. The latter has 5-in. maximum side channel depth and 1¾-in. flanges, 9/64 in. stock being used.

Fuel feed is by a vacuum system from a 11-gal. tank to a plain tube carburetor with 1⅞-in. venturi diameter.

## Specifications of New Dodge Commercial Express

Rating .....	½ ton	Piston material .....	Alloy	Venturi .....	1⅞ in.	Emergency .....	Transmission
Price, chassis .....	\$545	Length .....	4½ in.	Air cleaner .....	yes	Size .....	7 by 2 in.
Price, panel body .....	\$795	No. of rings .....	3	Fuel feed .....	Vacuum	Wheels .....	20 in. wood
Engine .....	4-cyl.	Width of rings .....	¾ in.	Oil filter .....	yes	Tires .....	4.75/20
Bore .....	3⅝ in.	Camshaft drive .....	gear	Crankcase ventil. ....	yes	Steer. gear .....	worm and sector
Stroke .....	4¼ in.	Head type .....	L	Gas tank .....	11 gal.	Springs, front .....	35½ by 1¾
Displacement .....	175.4	Valves: Inlet .....	1½	Oil capacity .....	4 qts.	Springs, rear .....	53½ by 1¾
Rating .....	21.03 hp.	Exhaust .....	1½	Clutch .....	Single plate	Road clearance .....	9¼ in.
Peak hp. ....	45 @ 2800 r.p.m.	Seat .....	45 deg.	Diameter .....	8⅞ in.	Drive type .....	Hotchkiss
Compression .....	4.6 to 1	Stem diam. ....	¾	Facing type .....	molded	Frame stock .....	9/64 in.
Crankshaft .....	3-bearing	Camshaft .....	3 bearing	Transmission .....	3-speed	Channel depth .....	5 in.
Diameter and length:		Electrical units ..	Delco-Remy	Universals .....	2-metal	Flange width .....	1¼ in.
Front .....	2¼ by 2½	Ignition .....	semi-automatic	Rear axle .....	semi-floating	Cross members .....	4
Center .....	2¼ by 1½	Starter .....	Bendix	Axle ratio .....	4.7 to 1	Overall length,	
Rear .....	2¼ by 2½	Generator drive ..	V-belt	Tread .....	56 in.	169 in. without bumpers	
Crankpin .....	2 by 1½	Battery .....	93 amp. hr.	Brakes .....	four wheel	Wheelbase .....	109 in.
Main bearings, type ..	Interch'g'ble	Cooling .....	pump	Type .....	Hydraulic	Chassis weight .....	1900 lb.
Piston pin diam. ....	¾ in.	Capacity .....	3½ gal.	Drums .....	11 by 1½	Body allowance .....	950 lb.
Bearing in .....	Piston	Carburetor .....	plain tube				

# Just Among

## A Radical Laborist Views the Automotive Industry

PRESENTING a radical laborist's view of the automobile industry, Robert W. Dunn in "Labor and Automobiles" charges the automotive manufacturers with a variety of evil things.

Factory executives will disagree with Mr. Dunn almost 100 per cent as regards his interpretation of the data which he presents. His volume, however, has significance for the automotive executive in that it presents clearly, frankly and vigorously the point of view of one who regards the Auto Workers Union "as the type of union that can most effectively organize the workers during the present period" and who urges "all workers to join it and put no confidence in the craft forms of organization."

\* \* \*

## Seeing the Author's Point of View

UNQUESTIONABLY, Mr. Dunn has written from a distinct point of view. It is difficult not to believe that many of his conclusions were formed before his investigations were started. This is indicated by the statement which appears near the beginning of his book: "No matter which company wins out in this race [the race for sales and dominance] it is plain that the workers of the industry are in for harder days. The boom period is definitely over. With the millions of shares of pyramiding stock crying for regular and extra dividends, with each company striking out harder for its place in a limited market, wage cuts and worsened conditions of work are inevitable. Exploitation of labor is intensified. Organization will be needed to defend such standards and conditions as workers have at present and to struggle for better ones."

## Among the Evils Charged Against Us

AMONG the multitude of evils which Mr. Dunn charges against the automobile manufacturers may be listed the following:

1. Indirect promotion of war, through stimulation of competition with other countries for markets.
2. Growing competition between big units certain to mean further exploitation of labor.
3. Wearing out workers through fast pace and throwing them out at 40 or 45 years of age; refusal to hire men over these ages.
4. Displacement of men by machinery.
5. Violation of Michigan state laws regarding employment of women and minors.
6. Average hours of workers longer than average union men work; no extra pay for overtime in many instances.
7. Unpleasant employment methods.
8. Actual earnings of workers in automobile plants lower than fair living income as determined by Government investigations.
9. Cutting piece rates or times with no operation change.
10. Setting up complex bonus systems as a means to make rate cutting less noticeable.
11. Dangerous and hazardous working conditions, and a continued increase in accident rate.
12. Use of "welfare work," stock ownership systems, bonuses, group insurance plans, etc., as a means of "fooling the workers."

## Loud Speakers for Employers' Propaganda

MR. DUNN writes off before they are given any criticisms of his views and his book, which might be made by *Automotive Industries* or by editors of similar publications whom he lumps together as "professional journalists and sycophants of the powerful American capitalists." Later he adds: "One must include also as instruments in the employers' offensive against the workers the dozens of vigorous local and national trade and manufacturing journals, all of them acting exclusively as loud speakers for employers' propaganda."

Were we theatrical producers instead of business paper publishers, we could probably find solace in blazoning forth publicity to the effect that "R. W. Dunn, labor journalist, calls automotive business press vigorous." But we aren't.

\* \* \*

## Changing Viewpoint But Not Facts

SCORES of examples could readily be chosen from the book where, with another viewpoint, at least an equally strong case could be built up from the same facts to support a view exactly opposed to Mr. Dunn's. His charge that the industry is a promoter of war, interested us especially because in the Aug. 13, 1925, issue of *Automotive Industries* we had an article showing how the automobile was functioning as a promoter of world peace.

When fundamental hypocrisy is presupposed in discussing the actions of any man or group of men, nothing whatever which that group may do can possibly be interpreted favorably. It is on such a presumption as regards manufacturers, it seems to us, that Mr. Dunn's thesis has been built. Occasionally we have heard automotive manufacturers build theories con-

# Ourselves

cerning labor on a similar presumption regarding labor. In neither case has the cause of Truth been served, so far as we could see.

## Uneven Employment and the Employer

TO "charge" manufacturers with having an uneven employment curve, for example, as Mr. Dunn does, is more or less like "charging" a man with being sick. We don't know a single automotive manufacturer who is not trying his level best to iron out the peaks and valleys in his employment curve and who, meantime, is not trying to alleviate the worst phases of that irregularity. The discussion which appeared on pages 686-687 of *Automotive Industries*, Nov. 17, 1928, may be pertinent in this connection. When labor is brought to Detroit today by advertising, automotive manufacturers unquestionably feel a responsibility to provide employment if at all possible and to stop the coming of more men if possible. No one can talk intimately and informally with high factory executives who have come up through the labor ranks themselves without feeling the sincerity of their expressions on this subject.

On many other topics treated by Mr. Dunn, the situation is somewhat similar. No manufacturer would pretend to claim anything like perfection of all conditions, but would insist—and correctly in a vast majority of instances—that sincere efforts were being made to improve conditions. Mr. Dunn simply refuses to believe in the existence of such sincerity among manufacturers. That being the case, of course, there isn't much basis for discussion.

## Radical Labor's Recent Decline

PERHAPS more interesting than anything else in the

book, is Mr. Dunn's own outline of the decline in strength of the radical labor movement in the automotive industry and of the complete failure of the more conservative American Federation of Labor to make any progress.

He says that, while the Machinists Union had between 7000 and 10,000 members in Detroit in 1919, at present it has less than 1000 workers on its books. Of the Carriage, Wagon and Automobile Workers' International Union, whose total membership reached over 45,000 in 35 locals during 1920, he says: "The Detroit local, although not powerful enough now to control conditions in any one plant, has members in Fisher Body, Packard, Dodge, Ford, Murray Body, Studebaker, Chrysler, Hudson and most of the General Motors plants and is now trying to build at least a small unit of loyal intelligent unionists in every auto plant in the vicinity." His discussion of the work of the Auto Workers Union also implies that little definite progress has been made.

## Cutting Piece Rates is Basis for Criticism

OF the various criticisms of automotive industrial practice made by Mr. Dunn, that of the practice of cutting piece rates is perhaps the most pertinent. While this practice is not nearly so prevalent today as it was a few years ago, just enough of it still exists in some quarters to lay the whole industry open to criticism. Cutting piece rates without any operation change simply because a worker is achieving high wages, not only is unfair to the worker, but inevitably destroys the incentive value of the piecework system or of any of its variations. Once that incentive value is destroyed, the reason for being of the system does not exist from the

standpoint of the manufacturer.

Mr. Dunn mentions names, dates and specific instances. His book is well indexed. Despite what this reviewer cannot help but feel to be a fundamental unfairness in approach, it can scarcely fail to be interesting to automotive executives desirous of getting a complete picture of the ideas of one element—though apparently a small one—involved in his labor and industrial relations problem. "Labor and Automobiles" is published by International Publishers, New York City. Its price is \$2.

## Another Viewpoint Develops Other Conclusions

W JETT LAUCK, secretary of the former War Labor Board and now teaching economics at Washington & Lee, illustrates another point of view in approaching labor and wage questions in a new book called "The New Industrial Revolution and Wages." Haven't had a chance to get through Lauck's volume carefully yet, but his thesis seems to be that the last five years have seen an unprecedented condition in industrial life with reduced production costs and lower prices taking place simultaneously with increasing wages and standards of living. His book, it appears, is an attempt to describe how and why these changes are taking place and also contains a discussion of the problems which have arisen from the new order—the problems of business instability, lack of coordination and the menace of unemployment.

"The economy of higher wages under the condition of increased productive efficiency has become firmly accepted and established by industrial and financial leadership." The Lauck book is published by Funk & Wagnalls Co., N.Y.C., and sells for \$2.50.—N.G.S.

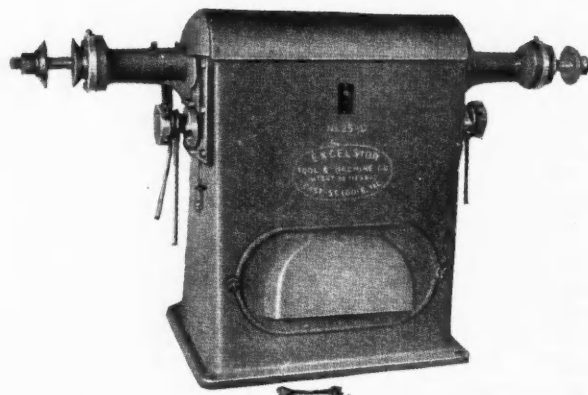


# NEW DEVELOPMENTS—Automotive

## Excelsior Polishing Machines

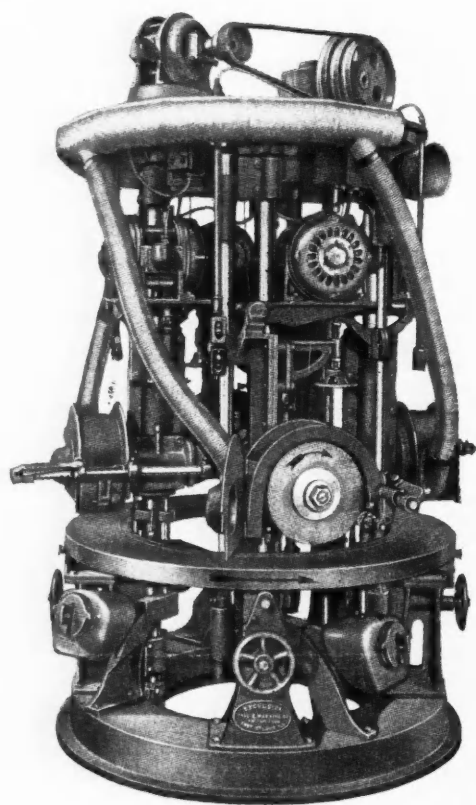
TWO new grinding and polishing machines recently have been developed by the Excelsior Tool & Machine Co., East St. Louis, Ill. One is a rotary feed grinding, polishing and buffing machine, designed for rough grinding, polishing or buffing flat or semi-flat articles, such as castings, forgings and similar work within the capacity of the machine, which may be placed on suitable containers or on a magnetic chuck on the revolving feed table. Four wheels are pro-

ferent speeds, one for polishing and the other for buffing, with speeds ranging from 1500 to 3000 r.p.m.



*Double spindle polishing and buffing machine made by Excelsior*

Wheel capacity is 16 in. diameter by 4 in. face or less on a 1½ in. spindle. Spindles are 39 in. from the floor.



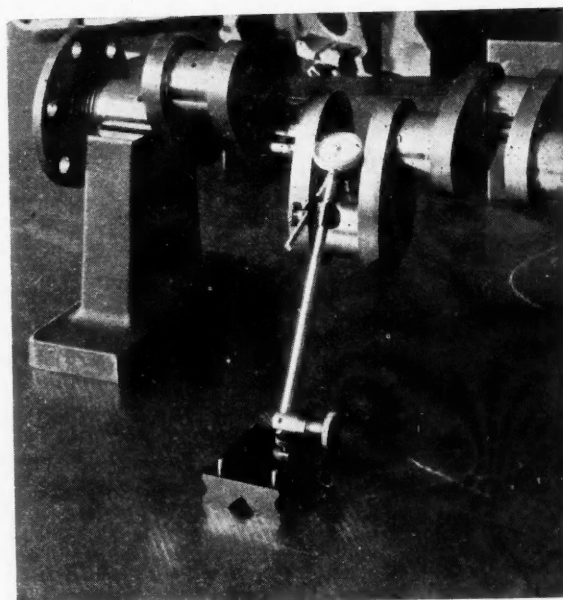
*Excelsior automatic 4-wheel grinder and polisher*

vided with adjustable speeds ranging from 1800 to 3000 r.p.m. The height of the wheels above the table is regulated by a hand wheel adjustment in front of each unit. Each unit is balanced by adjustable weights, so that any desired pressure can be applied to each wheel. The feed table is driven by internal gear and pinions connected to the worm reducer, which is belt connected to a motor with a three-step cone pulley for variable table speed. The overall height of the machine is 10 ft., the circular feed table diameter is 72 in., and its width 10 in. Table feeds are 5, 9 and 13 lineal ft. per minute. The motor speed is 900 r.p.m.

Another machine is a double spindle polishing and buffing machine, entirely self-contained with motor in base and with dust-proof ball bearing equipment throughout. The spindles of this machine are independent of each other and can be operated at dif-

## B. & S. Dial Indicator Set

BROWN & SHARPE MFG. CO., Providence, R. I., have announced a Universal dial indicator set No. 740, which can be adjusted to almost any position and can be used readily in narrow places and in holes inaccessible to the ordinary indicator. The outside diam-



*B. & S. Dial Indicator Set No. 740. View showing dial indicator being used to check automobile crankshaft bearing pins*

eter of the dial is 1 11/16 in., which makes it possible to be used in very small places. The tool consists of a dial indicator with hole attachment, a bar with an upright rod, slide with indicator rod and three chromium-plated contact points.

# Parts, Accessories and Production Tools

## Jaeger 8-Day Timepieces

A NEW instrument, an 8-day "Time of Flight" instrument, has been developed by the Jaeger Watch Co., Inc., New York, particularly for airplane use.

The "Time of Flight" instrument is a double-dial watch, the inner dial of which is a tabulating dial, recording the elapsed time a plane or car has traveled,

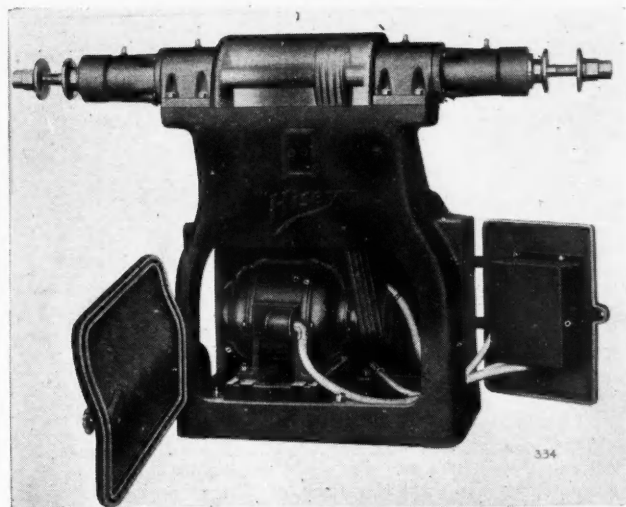


Jaeger "Time of Flight" instrument

time spent at landing fields, etc. The hands of the inner dial are controlled by pushing a small button on the right-hand front side, similar to a stop watch. It will indicate the elapsed time in hours and minutes. The instrument weighs but 11 oz. and can be had in black dials with white figures or silver finish with black figures, or if desired, the numerals and hands may be treated with radium paint. It has an 11-jewel, 8-day movement.

## Hisey-Wolf Buffing Machine

THE Hisey-Wolf Machine Co., Cincinnati, Ohio, has brought out a new Texdrive buffing and polishing machine. The spindle is supported at each end by two ball bearings or Timken roller bearings, as desired; the motor is mounted horizontally on a four-point bearing



Hisey-Wolf Texdrive buffing and polishing machine

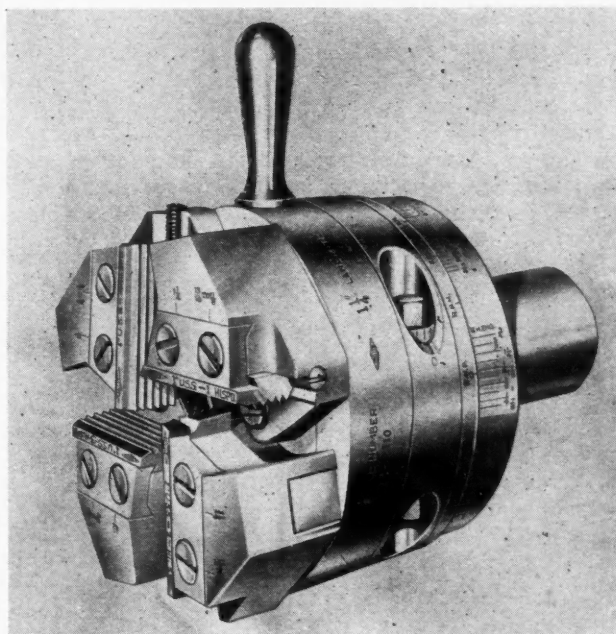
and slides on planed ways in order to secure proper belt tension for the Texrope drive. The motor starter is mounted on the inside of the door and is automatic, providing protection from low voltage, phase failure and overload.

Other features of the new machine are a Tobin bronze safety wheel nut, flat-top threads, extra-large nickel steel one-piece spindle, labyrinth seal on bearing housings, and a flat mounted starter button.

## Landmatic Die Head

THE Landis Machine Co., Waynesboro, Pa., has just placed on the market a new type of Landmatic Die Head for application to turret lathes and hand-operated screw machines. This new "F" type Landmatic was developed to produce full and correct threads when the stock ran out of line, such as is the case when the stock is slightly bent, when the turret and spindle are out of alignment, or when the gripping mechanism grips the stock off center.

The head floats on the shank, thus permitting the head to center itself around the center of the stock and to produce a full thread even though the stock revolves eccentrically. The flexible condition is controlled by



F type landmatic die head

two heavy springs. The locking mechanism is independent of the shank and floats with the head proper. The driving torque is transmitted from the shank to the head body and is also independent of the rest of the head.

Chasers are supported on the face of the head as in all Landis die heads, to insure a maximum of chip clearance and convenient access to the chasers when necessary to remove them for grinding. The head is made of treated and ground carbon steel, the adjusting worm is under proper turning tension at all times and Landis long-life chasers are employed.

# Hall Planetary Plant Has Unique Design and Operating System

*Glass side walls and roof of the building as well as its elevated location and isolation from traffic noises are novel features of industrial construction.*

By K. W. STILLMAN

ALTHOUGH erected over three years ago and so unusual in design that many manufacturing executives probably know something about it, the Philadelphia plant of The Hall Planetary Co. is so unique and contains so many valuable suggestions for both large and small concerns that it appears to be worth further discussion. Particularly is this true now that Mr. Hall, the president, after three years of actual trial of his many original ideas in plant design and operation, finds practically no items which he would change were he doing the job all over again.

Imagine, if you can without seeing it, a small plant devoted to the production of high grade machine tools which was located designedly on one of the highest elevations in Philadelphia and away from all through traffic arteries; a plant whose entire side walls and roof are of glass; a plant located in the midst of power lines but which produces its own power and light at a cost of about \$500 per year; a plant in which the

machine operations are well adapted to individual motor drive but in which all machines are driven from a single line shaft without loss of flexibility or of power through excess friction.

To find any one of these items in a successful manufacturing plant would be rather unusual, but to find them all, and many more minor items of similar nature, in a single plant is believed exceptional.

As can be imagined readily, Mr. Hall, president of The Hall Planetary Co., had some very original ideas about the plant he was going to build—so original, indeed, that he relates now the difficulties he had in trying to get many of them incorporated in the design of his building. But they were finally put across so successfully that they will be incorporated in the extension to the present plant, which is now being considered.

The products of the plant are thread milling machines, which are called upon to produce very accurate work. This, in turn, requires that the machines be



Fig. 2—A detail view looking toward the roof of Hall Planetary plant showing the type of framework used and the method of positioning line and jack shafts





Fig. 1—A general view of the Hall Planetary plant interior photographed with natural illumination and showing the glass side walls and roof

produced under the best possible conditions in order to insure the desired high grade of workmanship, and it was this factor, more than others, which dictated the design and construction of the plant.

As to the location of the plant, Mr. Hall had rather uncommon but apparently logical opinions about the effects of latitude and altitude upon workmen. His investigations convinced him that not only can human effort be most effectively employed in a band of latitude, such as that covering the north central portion of the United States, but also that under normal conditions, the greater the altitude of the plant site the more effective will be the human effort applied to production.

Philadelphia satisfied the condition of latitude and to meet the second requirement the plant was located at one of the highest spots in the city, some 200 ft. above sea level. It also is very definitely placed away from traffic arteries so that while it is within reasonable distance of a railroad, practically no traffic passes the plant except that directed to the plant itself. This brings about quietness, less diversion of the workers' interests and a general feeling of voluntary isolation which, Mr. Hall believes, is conducive to good workmanship.

In the design of the plant itself, good illumination was considered to be the most important item. To meet this requirement Mr. Hall went entirely outside of existing experience and built a factory which is all glass, from the foundations to the roof peak. Adequate

illumination, properly diffused to eliminate glare and shadows, was necessary in order to provide the best possible working conditions, to attract highly skilled workmen and also to permit them to produce their highest type of work. With the all-glass construction adopted, actual photometric tests have shown that at any point within the 100 x 160 ft. building available light is approximately 80 per cent of that available in the open air at the same time.

This may or may not constitute a record for plant lighting, either natural or artificial, but there certainly is no doubt that the Hall plant is an exceptionally pleasant place to work in and, in fact, has considerably better natural illumination than any modern office building the writer has ever entered.

The glass used is a special type of wire glass, yellow tinted to absorb glare, and is supplied in corrugated sheets exactly as corrugated steel roofing and siding material is furnished. The glass is fastened directly to the steel framework of the building by means of overlapping copper strips along the joints of the glass which are insulated by layers of felt. The entire assembly is cemented in place to make it perfectly rigid and air and water-tight.

While the nature of the glass prevents glare from entering the shop, during summer time it receives a spray coat of ordinary whitewash which so effectively reflects the heat rays from the sun that the interior of the plant is several degrees cooler than similarly located

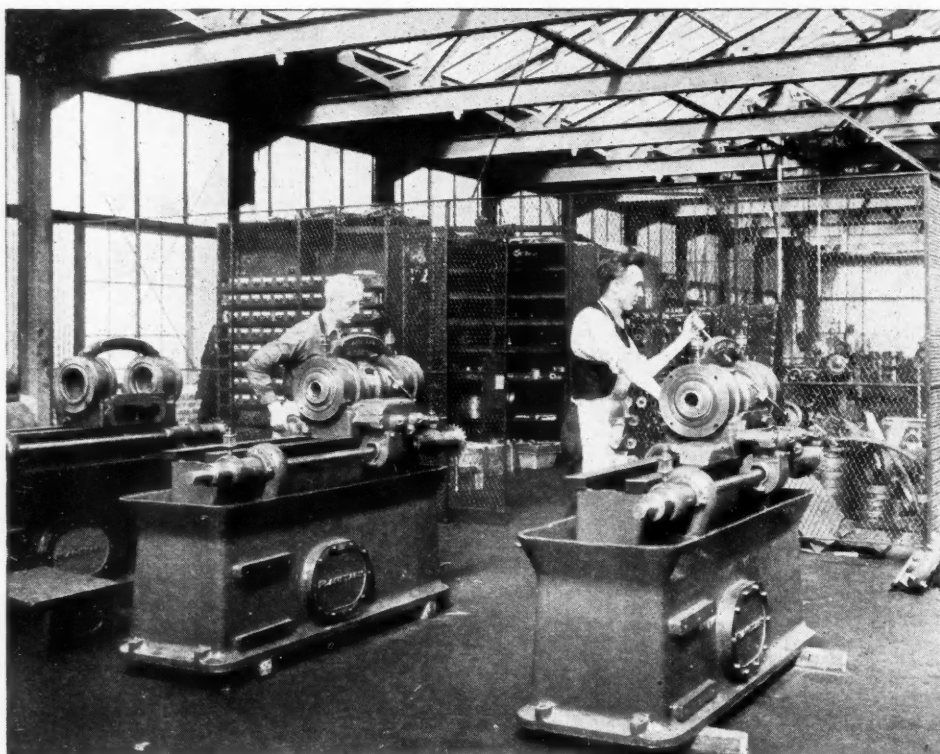


Fig. 3—A close-up view of an operating station. Note the absence of shadows

plants of convention single-story construction. The whitewash gradually wears off during the summer and the first frost in the fall completes the job, leaving the glass free to transmit heat rays once more and to assist in heating the interior—which, by the way, has been found to be no more difficult than with a conventional building.

The framework of the building is steel, of course, and not greatly different from usual construction except that it is much heavier. The glass side walls and roof are estimated to be little or no heavier than those of ordinary construction but the framework was made heavier to eliminate vibration so far as possible. This has been accomplished satisfactorily so that with all the machine tools in the plant driven from line and jack shafting, all attached to the frame work, there is no vibration noticeable anywhere in the building.

The design of shafting hangers is an unusually interesting point. Believing in the ultimate economies of individual motor driven machine tools, The Hall Planetary Co. was unable to assume the extra expense of installing this type of equipment when the new plant was built. Mr. Hall then sought to bring about as nearly ideal conditions as possible with line and jack shaft drives and has attained such a state of perfection that he is now very doubtful whether individual motor driven equipment would offer any advantages either in greater flexibility of equipment or in power savings.

The framework is of double truss construction with the columns and girders being made up of two channel sections fastened together to form I-beams. Reinforcing and bracing members are inserted between the

channels so that the latter are about 2 in. apart. Herein lies the secret of the flexible line shaft installation. All line shafts and jack shafts are mounted on rail section sub-frames and these sub-frames are secured to the columns or girders by bolts passing through the opening between the channels. Thus no holes need be bored in the framework to secure the shafting. To move one section to another place requires simply the loosening of four nuts and lifting the sub-frame to its new place by crane, and refastening.

All line shafts and jack shafts run in anti-friction bearings and, since the line shaft passes through the center of the building, it has been possible to locate machines so that belt pull on the shaft is evenly distributed on each side, thus reducing to a minimum power losses due to distortion of the shaft.

Carrying out the idea suggested above, Mr. Hall has permitted no holes to be made in the steel framework except those required in its erection. Besides the shafting, all other fixtures such as lighting equipment, hoists, water buckets and similar items are attached to the framework by unique

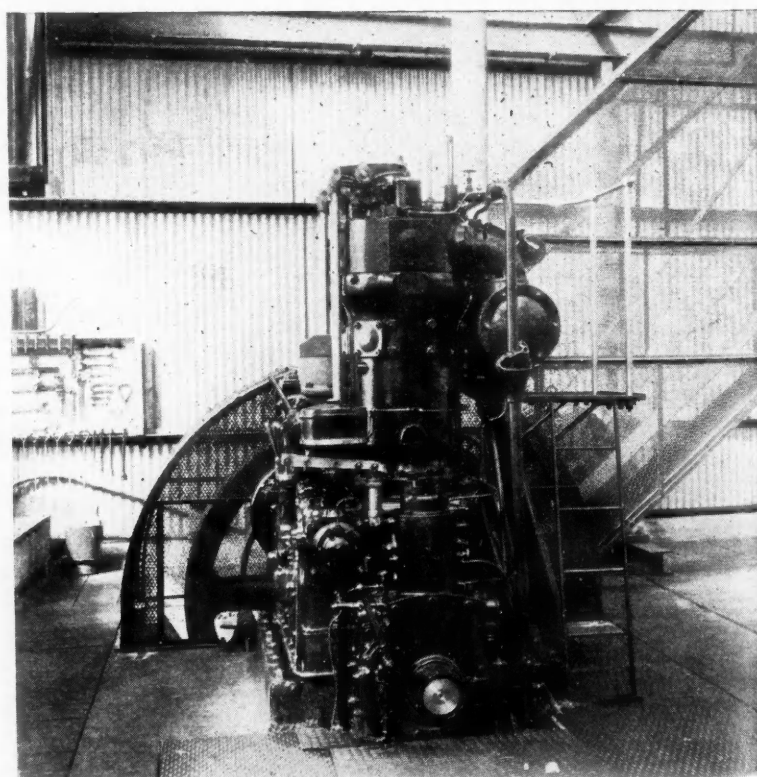


Fig. 4—The 150 hp. Diesel engine which furnishes power and light for the factory and heat for the office. Note the effective guarding of the flywheel and belting



clamps so that should the plant be dismantled the salvage value of the steel work would be nearly 100 per cent.

Incidentally, Mr. Hall has looked forward to the possibility of legislation demanding complete protection from shafting and all his line and jack shafting is above the trusses so that wire netting or similar material can be placed in position readily to protect the workmen below.

Electricity for both power and light and for heating the offices is supplied by a 150 hp. Diesel engine which burns an average of 20 gal. of fuel oil daily at an annual operating cost of about \$500. To supply power to about 100 machine tools of varying types and sizes, this is an unusually low cost figure and, in fact, is less than half of the next nearest estimate of cost made for other types of prime movers or for purchased power.

The main plant is heated by a gas furnace equipped with an humidifier and, as another instance of the thought given to the design of the building, the warm air ducts are carried under the floor alongside the walls so that during winter the floor is always warm to the workmen's feet. Artificial illumination is provided by conventional type bulbs and reflectors, but they are

placed on unusually close centers. Since night and overtime work is rarely engaged in, the lamps are seldom used except in winter because it is a very unusual day when the natural illumination in the plant is not at least as good as the best artificial lighting which has yet been installed in factories.

Taking everything into consideration, Mr. Hall is very much pleased with the way his ideas have worked out. The first cost of the plant was about 40 per cent more than for a conventional building of the same type. Of this added cost, about 20 per cent came from the glass side walls and roof, 10 per cent for the heavier steel work and the remainder from various other items.

To compensate for this is a plant which attracts and keeps the very highest type of workmen; permits them to work to the best advantage with its direct effect upon quality as well as quantity of product turned out; a plant which has very low maintenance and operating costs and, an indefinite but valuable item, is a constant source of pride to the entire organization in the knowledge that they enjoy as splendid working conditions and work in as unique plant as can be found anywhere among industrial buildings.

## Automotive Export Growth Needed

(Continued from page 652)

ing conditions. Few domestic sales executives have the time, even if they have the inclination, to give sufficient attention to all of these factors. Export executives can and do. That is why firms in the United States handling Canadian business through their export departments are building a larger volume and firms not doing so are complaining that their Canadian sales are not increasing."

Automotive market possibilities in Japan and China were touched upon by M. J. Falkenburg, president of the Falkenburg Trading Co., of Seattle, Wash., in his address on "Progress in the Far East."

"The automobile is replacing the jinrikisha in all of the larger cities of Japan," Mr. Falkenburg said, "and better roads are being built through the country so that it is possible to motor from Tokio to Nikko or to Yokohama and Kobe. These highways are not hard-surfaced or paved, but are the natural soil surfaced with gravel similar to our old-fashioned country roads. Outside of the cities, automobiles are seldom seen, but Japan is making actual progress toward the construction of trunk roads connecting her principal cities and in widening their streets, so that automobiles are now a necessity rather than a luxury within the cities. Large numbers of our used cars are finding a second lease on life in the Orient.

"One is impressed by the numerous automobiles in the principal seaport cities of China," continued Mr. Falkenburg, "and by the efficiency of the traffic officers and signal systems, which in some respects are as modern and more satisfactory than our own. Considering the heterogeneous type of traffic and the difficulties of avoiding accidents under the condition of pedestrians, jinrikishas, pushcarts, wheelbarrows, trucks, donkeys, camels and automobiles all mixed together, it is quite remarkable that the traffic moves with as few accidents

as it does. It is really commendatory of the traffic police that no greater trouble is experienced and that progress is made as rapidly as it is.

"Outside of the cities, one is continually disappointed by the highway situation," Mr. Falkenburg went on to say. "I was told that it would take all day to drive the 80 miles from Tientsin to Peking, and by the appearance of the road as we encountered it along the railway, I am quite sure that it would, and furthermore, the trip would have been extremely arduous and difficult, as the road was muddy and terribly rough throughout. China has under consideration a highway program which, if carried out, will result in a trunk road between the principal cities. The fact that this is even seriously contemplated is in itself a vast improvement over conditions as they have been.

"Much is said about the possibilities of trade with this enormous number of people," Mr. Falkenburg continued, "but few realize that before they can purchase very much, their wages must be increased so that they will have something to buy with. First they must be better fed, clothed and housed, and then they can begin to think about things which would be luxuries to them, but are far below our standard of necessities. With whole families living within thatch, stone or mud huts, not larger than a small one-car garage, it readily is to be seen that they are not immediately going to buy talking machines or motor cars. It is true that there are a great many rich Chinese who can afford these luxuries, and where conditions permit, they promptly make use of them."

Conditions in the Far Eastern countries, he said, are the best they ever have been for our trade; there is less ill-feeling and a more stable condition in Asia than at any time recently, and the opportunity for increasing our trade never was so favorable.



First with  
the News

Reliable,  
Accurate

# News of the Industry

PAGE 674

VOLUME 60

Philadelphia, Saturday, April 27, 1929

NUMBER 17

## High Output is Continued With Decrease Indefinite

PHILADELPHIA, April 27—With the exception of certain manufacturers who are setting their shops in order preparatory to making model changes, the majority of automobile factories have entered the final week of April with high production schedules—in many cases maximum capacity—prevailing. It is generally believed that the peak of production has been reached and that there will be a decline before the close of the second quarter, but just when the general slackening in output will take place is not yet certain.

Automobile sales during January, February and March were highly gratifying and tended to justify the high production recorded, and the advent of favorable weather has accelerated buying during April. However, considering the car production since the first of the year as compared with retail sales, it is difficult to believe that the industry as a whole will increase its production in May, despite the high production schedules contemplated by some of the leading producers. New car stocks in dealers' hands, while considerably heavier than at this time last year, are reported as spotty. Some manufacturers have indicated that they cannot produce enough cars to keep up with the demand.

At this moment, the situation of Ford and Chevrolet attracts widespread attention. Indications are that the Ford Motor Co. this month will exceed its March production, which was reported to be in excess of 181,000 units. It has been shown that deliveries on the Ford Tudor sedan are slow in some centers. Chevrolet is holding close to the sales volume being enjoyed by Ford. H. J. Klingler, general sales manager of the Chevrolet Motor Co., informed a representative of *Automotive Industries* that many of the company's dealers are receiving more orders than the factory can fill immediately. Mr. Klingler said that Chevrolet plans to build approximately 160,000 units in May.

### G. M. Earns \$61,910,987

NEW YORK, April 25—The General Motors Corp. today reported earnings for the first quarter, 1929, as \$61,910,987, as compared with \$69,468,576 in the corresponding period last year. After preferred dividends, this equals \$1.37 a share, as compared with \$1.54 a share last year, on a comparable basis.

### Rice, Willys and Reeves

#### Greet German Tax Group

NEW YORK, April 25—State funds should go for state roads and should not be refunded in part to counties, H. H. Rice, chairman of the Taxation Committee of the National Automobile Chamber of Commerce, said in his welcome address to visiting delegates of the German Gas Tax Commission yesterday. Robert Kaufmann, chairman of the Commission, in his reply, outlined the purpose of the visit. John N. Willys, chairman of the Export Committee of the N.A.C.C., welcomed the delegates on behalf of the industry.

Alfred Reeves, general manager of the N.A.C.C., pointed out that the Federal Government had abandoned the general wartime excise tax on automobiles, recognizing that highway taxation is the prerogative of the state. Professor F. G. Crawford, of Syracuse University, discussed present gasoline taxation methods. The meeting was resumed today, with addresses by R. C. Holmes, president of the Texas Corp., and G. C. Woodruff, of the New York Central Railroad.

### Buick's Car Marquette

DETROIT, April 25—The new line of cars to be produced by the Buick Motor Co., as previously announced in *Automotive Industries*, is to be known as the Marquette, it was stated today by E. T. Strong, president and general manager of Buick.

### Maise Leaves Briggs

DETROIT, April 25—H. C. Maise, associated with the Briggs Mfg. Co. for the last ten years, has announced his resignation as vice-president and general manager.

### Car Stock Index Holds Favorable

NEW YORK, April 24—The index of quotations for common stocks of automobile and truck manufacturers, compiled as of April 18 by the Standard Statistics Co. of New York, was 276.5, compared with 274.3 for April 11 and a high for 1929 of 294. (1926 equals 100). The index for automobile parts and accessories stocks was 253.5, against 248.1 on April 11 and a 1929 high of 272.1. Automobile tire and rubber stocks fared well, the index April 18 standing at 199.0, against 197.8 on April 11 and a 1929 high of 214.1.

### Stockholders of Jordan

#### Approve Adding Common

CLEVELAND, April 25—Stockholders of the Jordan Motor Co., Inc., yesterday approved by more than two-thirds vote the action of the directors in accepting the proposal of debenture holders to exchange these obligation for common stock and approved increasing the common stock from 300,000 to 500,000 shares, with 150,000 shares of this issue to provide for the exchange.

The company reported satisfactory progress during the first quarter, 1929, with profit now averaging approximately \$60,000 net per month. Orders on hand are satisfactory, it was said, with dealers selling all cars shipped from the factory, and no stocks on hand. Edward S. Jordan was reelected president, John McArdle, vice-president and general manager, and A. F. England, secretary and treasurer.

### McAleer Co. Reorganizing

DETROIT, April 25—The McAleer Mfg. Co. has been formed here to take over the business formerly operated by the C. H. McAleer Mfg. Co. Active management will continue in the hands of C. H. McAleer and associates. The officers of the new company are: C. H. McAleer, president; R. M. Buckingham, vice-president; Tom Walton, vice-president, and M. J. Riordon, secretary. The company will continue the manufacture of rubbing compounds.

## Willys Enlarging California Plant

Construction of \$1,000,000  
Unit is to be Started  
Immediately

LOS ANGELES, April 23—An addition costing \$1,000,000 is to be built at the Pacific Coast plant of Willys-Overland, Inc., immediately, it was revealed here yesterday, when it became known that the J. William McNeil Co., who handled the construction contract of the \$1,500,000 first unit, had contracted to do the new work. Local factory officials declined to make any statement, but it was learned also that a steel company here is bidding to supply the structural steel.

The addition will allow a one-third increase in production, to follow a sales increase of 100 per cent in the first quarter in southern California, as compared with the corresponding period last year. John N. Willys, president, and A. D. Qually, secretary, of Willys-Overland, were in Los Angeles April 5, presumably to further construction plans. The purpose of the visit was not announced at the time.

## Pierce-Arrow Preferred Put on Dividend Basis

BUFFALO, April 24—Directors of the Pierce-Arrow Motor Car Co., meeting yesterday, placed the preferred stock on a regular dividend basis by declaring 1½ per cent payable June 1 to stockholders of record May 10, covering the period from March 1 to May 31. The company reported net profits for the quarter ended March 31 as \$448,531, compared with a loss of \$359,763 in the corresponding period last year. This equals \$2.07 per share on the Class A common, after providing for one month's preferred dividends.

A. R. Erskine, chairman of the board, announced that sales in the first quarter were 1979 cars against 1224 last year, a gain of 61 per cent. Production and sales are exceeding 60 cars a day, it was said, and 1300 cars are estimated for April. Unfilled orders exceed 2000 cars.

## Erskine Estimates Earnings

NEW YORK, April 25—At the annual stockholders' meeting, at Jersey City this week, A. R. Erskine, president, Studebaker Corp. of America, estimated earnings for the first quarter, 1929, as \$4,500,000, or about \$2.30 a share on the increased capitalization of 1,893,750 shares of no par common, after payment of the 1 per cent dividend March 1.

## Battery Event Sets Record

CINCINNATI, April 25—The largest opening attendance in the history of the National Battery Manufacturers Association was recorded here yesterday when W. S. Perry, president, called the

annual conference to order. Mayor Seasongood delivered an address of welcome and the rest of the day was devoted to committee meetings on a code of ethics. Today's program included President Perry's address and the reports of P. M. Marko, treasurer, and Commissioner W. J. Parker, together with committee reports. The convention will close tomorrow night with a banquet at which Federal Trade Commissioner Humphrey will deliver the chief address.

## Ford of France Issue of \$2,000,000 Announced

NEW YORK, April 25—Considerable interest has been aroused in financial circles by the announcement that Ford Motor Co. of France, subsidiary of Ford Motor Co. of England, is to float an issue of \$2,000,000 of that stock today.

The new French company, which is a merger of Credit Ford with a capital of 2,000,000 francs, and Automobiles Ford with a capital of 76,000,000 francs, will float in addition 52,000,000 francs in stock of 100 francs par value, making a total capitalization of 130,000,000 francs.

## Allison to Expand

INDIANAPOLIS, April 25—An addition and improvements costing \$1,000,000 will be begun at once by the Allison Engineering Co., in this city, according to Capt. E. V. Rickenbacker, head of the syndicate that bought the James Allison estate. Upon this expansion, 1000 men will be employed in the making of patented process ball bearings, gears, superchargers and airplane engines. No stock issue is planned.

## Stewart Using Auxiliary

BUFFALO, April 23—The Stewart Motor Corp. has announced that a Brown-Lipe 3-speed auxiliary transmission has been incorporated in its Model 22X, 6-cylinder, 4-ton truck. The auxiliary is mounted amidships and when used in connection with the standard unit-mounted 4-speed transmission produces a range of 12 speeds.

## Chrysler Appoints Foy

NEW YORK, April 25—Byron C. Foy, of Simons, Stewart & Foy, Chrysler distributor for the metropolitan district, has resigned to become associated with Walter P. Chrysler in the conduct of Mr. Chrysler's personal affairs.

## Campbell Drops Mile Attempt

PHILADELPHIA, April 25—Dispatches from Verneuk Pan, Cape of Good Hope, South Africa, this week say that Capt. Malcolm Campbell definitely abandoned further attempts to break the mile record of 231 m.p.h. established by Major Segrave. In his 900-hp. Napier Lion "Bluebird," the British sportsman attained speeds of 224.58 and 212.51 m.p.h. in two attempts over the measured mile, making his average for both runs 218.54 m.p.h.

## Kelsey-Hayes and Wire Wheel Merge

Stock of New Corporation to  
be Divided into Two  
Series

NEW YORK, April 25—Stockholders of Kelsey-Hayes Wheel Corp. and Wire Wheel Corp. of America, meeting coincidentally today, approved the merger of these two companies into one New York corporation to be known as Kelsey-Hayes Wheel Corp. The new corporation is to have an authorized capital of 40,205 shares of 7 per cent cumulative preferred stock of the par value of \$100, all to be outstanding, and 1,000,000 shares of common stock without par value of which 642,389 shares will be outstanding.

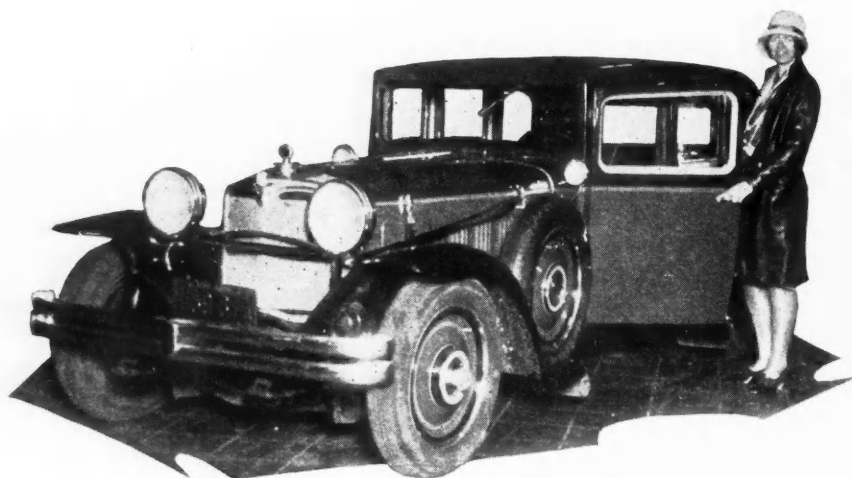
The preferred stock of the new corporation will be divided into two series, the shares of each series to rank equally, excepting that shares of the Series WW will be subject to redemption at and will be preferred on dissolution in the amount of \$110 per share and accrued dividends, and Series KH will be subject to redemption at and preferred on dissolution in the amount of \$125 per share and accrued dividends. In other words, Series WW will be redeemable under the present terms of preferred stock in Wire Wheel Corp. and Series KH subject to terms prevailing for present KH stock.

Preferred stockholders of Kelsey-Hayes will receive one share of new preferred stock Series KH for one share of present Kelsey-Hayes stock while preferred stockholders of Wire Wheel will receive one share of new Series WW preferred stock plus 58 1/3 cents in cash adjustment for each share of Wire Wheel preferred now held. Common stockholders of present Kelsey-Hayes Wheel Corp. will receive one share of common stock in the new corporation for each share of common stock in the present Kelsey-Hayes. Class A stockholders of Wire Wheel Corp. will receive five-sevenths of a share of preferred stock Series WW in the new corporation plus \$1.66 2/3 in cash for each share of Class A in Wire Wheel. Common stockholders of Wire Wheel Corp. will receive 59 cents for one share of common in the new corporation for each share of present Wire Wheel held. The new corporation will have a board of directors consisting of 11 members of the board in present Kelsey-Hayes Wheel Corp. and four members of the board of Wire Wheel Corp.

## Wright Engine Approved

WASHINGTON, April 25—The Aeronautics Branch of the Department of Commerce has issued an approved type certificate covering Wright R540 five-cylinder radial air-cooled airplane engine, it was announced this week. The rating of the engine was 165 hp. with 2000 r.p.m.





**The Front-Wheel Drive Ruxton Now on Display**

*The highest point on the new Ruxton car is five feet above the ground, and the weight of the automobile is 2500 pounds. The manufacturers claim that 30 per cent more power can be obtained from the engine through application of the front-wheel drive principle*

## Borg-Warner Buying Morse Chain Assets

CHICAGO, April 23—The Borg-Warner Corp. has completed negotiations for the acquisition of controlling interest in the Morse Chain Co. of Ithaca and Detroit, it was officially announced yesterday. The transaction will be handled through an exchange of Borg-Warner stock for that of the Morse company, the amount depending upon final determination of the value of certain assets of the latter company which are not to be acquired.

The Morse Chain Co. is the leader in the manufacture of timing chains and sprockets for automobiles and has a substantial business in the manufacture of power transmission chains and gearing for industrial purposes. Earnings of the company for the year ended Dec. 31, 1928, amounted to \$1,346,252, after charges, including depreciation and Federal taxes and after adjustment to eliminate the subsidiaries not being acquired in the present transaction. Borg-Warner is not acquiring the aircraft adding machine, typewriter and electric clock divisions.

The Borg-Warner Corp. will acquire the Morse company's two plants at Ithaca and Detroit, as well as an English company, Morse Chain Co., Ltd., and properties formerly owned by the Ithaca Street Railway Co. These last mentioned properties will be acquired because of hydraulic power rights included, which is purported to develop for furnishing power to the Ithaca plant.

## Fairchild, Ltd., to Build

MONTREAL, April 23—In confirming the report that Fairchild Aviation, Ltd., had merged its interests with several other Canadian commercial aviation concerns, E. Wilson, Fairchild president, announced that his company will construct a large aircraft factory in

Canada in the near future. Mr. Wilson said the site had not been chosen but that it would be in the Province of Quebec. The companies entering the recent merger include International Airways of Canada, Ltd., Hamilton, and Canadian Airways, Ltd.

## Man to Succeed Kreider Has Not Been Appointed

NEW YORK, April 23—An official of the Kreider-Reisner Aircraft Co. made known here yesterday that the successor to the late A. H. Kreider, president of the firm, who was killed in an accident at Ford Airport, Detroit, recently, had not yet been named. The majority stock in the company recently was obtained by the Fairchild Aviation Corp., which is now controlled by the Aviation Corp.

In the accident at Detroit, William C. Taylor, chief engineer of the Stout Air Services, also was killed. Formerly he had been chief engineer of the Stinson Aircraft Corp.

## Fisher Provides Service for All G.M. Car Bodies

DETROIT, April 23—The establishment of the Fisher Body Service Corp., with assets of more than \$1,000,000, to provide body parts for depots now at Oakland and Detroit, and a system of body service available to all owners of General Motors cars in the service stations of General Motors dealers, have been announced by officials of the Fisher Body Corp.

## Equipment Firms Merging

NEW YORK, April 25—The Moto Meter Gauge & Equipment Corp. has been formed under the laws of Delaware to complete the merger of the Moto Meter Co. and the Safe-T-Stat Co. The plan of the merger is being worked out and is to be announced in a few days.

## Ruxton Will Enter Production in June

### Andrews Reveals Specifications of New Front-Wheel Drive Model

LOS ANGELES, April 25—A new car to be called the Ruxton, employing the front-wheel drive and fitted with a straight-eight engine, will go into production in Detroit about June 1, in a factory now producing another car, and first deliveries will be made about July 1. This information was revealed here yesterday, in an interview with a representative of *Automotive Industries*, by A. M. Andrews, temporary president of the company behind the car. The factory base price will be \$3,200.

New Era Motors, Inc., a Delaware corporation, with an authorized capitalization of \$5,000,000 preferred stock and 100,000 shares of common, will build the car, it was explained. The company has offices at 11 East 45th St., New York City, with S. E. Welch in charge. Mr. Andrews declined to name the factory in which initial production of the new car is to take place.

Specifications outlined briefly by Mr. Andrews show that the engine which will be manufactured by New Era Motors, Inc., will have a 3-in. bore and a 4½-in. stroke, and that it will develop 95 hp. on the brake. The car will have a wheelbase of 130-135 in. and the wheels will be fitted with balloon tires 32 in. in diameter. A Long clutch and a transmission of the company's own make will be used. The gear shift lever will be located on the dash and the emergency brake lever on the left hand side. This brake will be of the mechanical type, while the service brakes will be four-wheel hydraulic brakes. Items of equipment include a Zenith carburetor and a Delco generator and starter. The fuel tank will be located under the rear seat. The car will be fitted with a body by Budd and will have a top speed of 80 m.p.h.

A corporation is being formed in California by B. H. Dyas, head of a retail merchandising organization in Los Angeles, to handle Pacific Coast distribution of the car. An experimental job is on display at the Dyas Hollywood store with demonstrations being given on the roof. This car reveals the front-wheel drive and all other features except the engine to be used on the Ruxton.

## Fafnir Expands Plant

NEW BRITAIN, CONN., April 24—The Fafnir Bearing Co. of this city has added two new wings to its plant, increasing its floor space nearly 50 per cent, to a space of approximately nine acres. This addition to its factory has been made necessary by the increasing popularity of its new ball-bearing spring shackles.



## Mills Hindered by Material Scarcity

### Decreased Supply of Semi-Finished Steel Follows Automotive Demand

NEW YORK, April 25—Tightness in the supply of semi-finished steel is a cause of growing inconvenience and worry to non-integrated rollers of sheets and strip. This paucity reaches back to the supply of raw steel. In the last few days isolated transactions have been reported in ingots, which primitive form of steel, entailing much waste in transportation and reheating, is only traded in when there is an intensive scarcity of steel. While so far none of the finishing mills has had to halt operations for want of semi-finished material, the task of obtaining sufficient supplies to avoid interruption is growing more difficult.

Recent announcement by one of the leading concern's subsidiaries of an advance in its quotations on sheet bars, billets and slabs to the uniform level of \$36 per ton has resulted in a premium market. Ordinarily this subsidiary is not a seller of semi-finished sheet in the open market, supplying a limited number of finishing mills under special, long time contracts. As the result of this announcement, however, the open market moved into decidedly higher ground with some sheet-rollers having trouble to get sheet bars at \$37.

Demand for billets and slabs is a shade easier than that for sheet bars, reflecting, perhaps, slightly less pressure on the supply of strip-steel. Producers of full-finished automobile sheets continue to operate at capacity. The market for this specialty rules strong. Blue annealed sheets are steady, but some little price-shading is reported in the market for black sheets. Shipments of cold-finished steel bars into automotive consumption continue to be in good volume. The market for automotive alloy steels continues on an even keel. Automotive consumers call for good-sized shipments of bolts and nuts.

### Durham Leaving Buick

DETROIT, April 25—C. B. Durham is retiring as vice-president and assistant general manager of the Buick Motor Co., and will join the staff of Alfred P. Sloan, Jr., president of the General Motors Corp., it was announced yesterday by E. T. Strong, president of Buick, after Mr. Durham had returned from Europe. In honor of Mr. Durham's 20 years of service with the company, a dinner was given him in Flint, last night.

### To Make Gliding Seats

BUFFALO, April 24—The Mechanical Devices Corp. of America, with a capitalization of \$150,000, has been formed here to manufacture gliding seats for automobiles. The general

offices are at 101 Oak St., and the main plant is at Pontiac, Mich. Officers and directors of the company include: A. C. Finley, president; C. E. Wettlaufer, vice-president; G. H. Finley, treasurer; W. H. Finley, secretary, and M. P. Browne, chief engineer.

## New White Truck Model 59 Offered

CLEVELAND, April 23—A six-cylinder, 100-hp. tractor truck, known as Model 59, is being offered by the White Co. This new model, which is built up of standard parts, is sold only on specifications, which are based upon a study of the particular service for which each unit is to be used. Model 59 is available also as a truck for handling unusually heavy loads at high speeds, and has been adopted for use as a six-wheeled unit. While the standard tractor wheelbase is 153 in. the wheelbase length varies with the job.

The engine, which is virtually the same as that used in the White bus Model 54, has a 4 $\frac{3}{8}$  in. bore and 5 $\frac{1}{2}$  in. stroke, overhead valves and dual ignition, and is mounted in unit with a two-plate dry clutch and a four-speed transmission.

## Gotfredson Announces New Firm in Detroit

DETROIT, April 23—Formation of the Robert Gotfredson Truck Corp. with headquarters at 3599 Gratiot Avenue, has been announced by Robert Gotfredson, former vice-president of the Gotfredson Truck Corp. Mr. Gotfredson states that engineering details of a new truck will be made shortly. It will embody six-cylinder high speed performance, he says, and will include models from one ton upward.

Several well-known truck men and bankers will be interested in the new company, Mr. Gotfredson states. Among them are John J. Barlum, chairman of the board of the American State Bank; Robert M. Allan, president of the American State Bank; Arthur C. Grambo, and L. R. Richards, formerly with the Gotfredson Truck Corporation; Henry Vroom, president of Henry Vroom & Son of Detroit.

### Chrysler Adds Roadster

DETROIT, April 20—A new Chrysler Imperial roadster, with body by Locke & Co., available in four color combinations, has been introduced. The rumble seat compartment is provided with a windshield which, when not in use, folds down, becoming part of the rear deck. The model lists at \$2,895.

## Rubber Groups See Merger

NEW YORK, April 24—The Rubber Association of America, Inc., and the Rubber Institute, Inc., have called special meetings of their members for May 10, each to take action toward merging the interests of the two organizations.

## Hercules Products Rushes New Plant

### Body Production of Three Units to Total 600 Daily

EVANSVILLE, IND., April 23—Hercules Products, Inc., commercial car body building division of Servel, Inc., is preparing to begin operation of its recently acquired plant here early in May. The new factory, formerly owned by the Bockstege Furniture Co., is to be known as Plant No. 3. It is equipped with four lumber kilns and will include a large lumber storage yard. A shipping building, 100 by 60 ft., is under construction.

New wood-working tools will cost about \$75,000, according to officials. The plant, which will afford 150,000 sq. ft. of operating area, is to enter production on a schedule of 100 bodies daily, to be gradually increased to 400, with 10,000 employees. H. H. Wessling, general superintendent; M. W. Burton, superintendent, and Col. James Guthrie will be responsible for plant operation.

## Car and Truck Exports From Canada Set Record

WASHINGTON, April 25—Exports of passenger cars and trucks from Canada during February totaled \$4,584,689, recording an increase of 20 per cent over January exports, and setting a new high record for February exports, according to figures announced this week by the Automotive Division of the U. S. Department of Commerce.

Passenger car and truck units exported in February exceeded by 164 per cent the exports in February of last year and increased by 20 per cent over January, 1929, says the division.

## March Output, a Record for M. & E. A. Members

NEW YORK, April 24—Manufacturing members of the Motor and Equipment Association broke all records for the second consecutive month during March of this year when the grand index of all divisions, based on January, 1925, as 100, reached a figure of 241 as compared with 212 in February of this year. This figure also compares with 200 in March of last year and is particularly noteworthy in view of the fact that only in August of last year was the index of 200 surpassed.

### Durant Appoints Cary

DETROIT, April 25—C. P. Cary has been appointed manager of the commercial vehicle department of Durant Motors, Inc., it was announced today by R. T. Hodgkins, general sales manager. Mr. Cary has been in the truck industry for a quarter of a century, having been associated with Franklin, Peerless, Garford Motor, and the Graham brothers.

# Men of the Industry and What They Are Doing

## Henry and Edsel Ford Organize Radio Firm

Henry and Edsel Ford will control a new \$100,000 radio service corporation, it was disclosed this week in a request before the Michigan State Public Utilities Commission. The new company is to be known as the Ford Communications Co., a Delaware corporation. Hearing on the request has been set for April 30. The stock is divided into 1000 shares of \$100 par value, the majority of which is controlled by Ford interests.

The company is organized for the purpose of national and international radio and cable communication. It asks for the power to operate broadcasting stations, to acquire radio patents and to transmit radio news and communications by land, the Great Lakes and the sea.

### Raskob Report Unconfirmed

Reports that John J. Raskob, recently chairman of the finance committee of General Motors Corp., was to be appointed to a like position in the directorate of the United States Rubber Co. have been circulated but have received no comment from either the offices of the rubber company or from du Pont interests with which Raskob is closely affiliated, and which are understood to hold a virtual control of the rubber company.

### Kelly Elected President

Daniel H. Kelly, executive vice-president of the Electric Auto-Lite Co., has been named president of the USL Battery Corp., wholly owned subsidiary. C. O. Miniger was named chairman of the board succeeding E. H. Gold who died last November. The Niagara Falls, N. Y., company reelected all its directors.

### Blagden and Hart Promoted

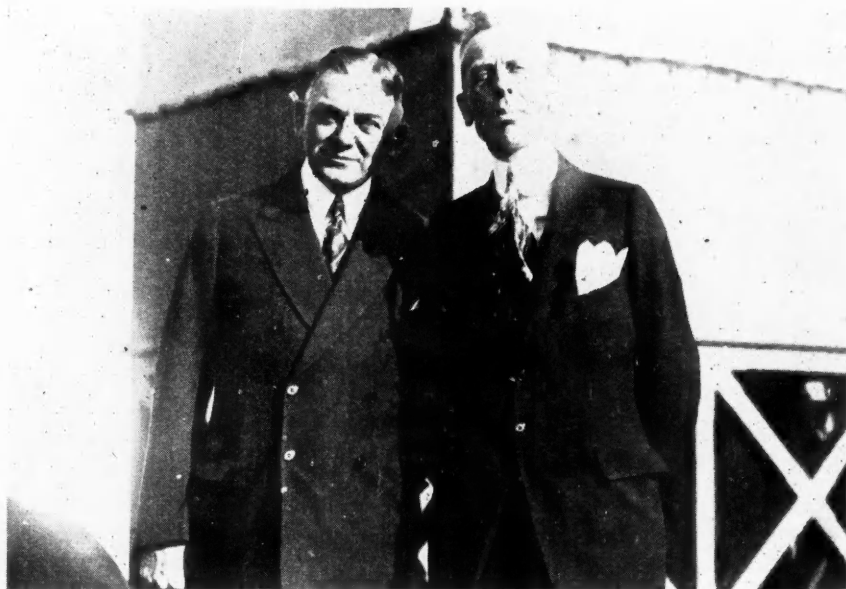
W. C. White, president of the White Co., has announced the promotion of Thomas Blagden, Jr., Australian division manager, to vice-president of the export region, and the promotion of L. M. Hart, managing director of the White Co., Ltd., to vice-president of the Canadian unit.

### Pierce Joins Burgess-Norton

H. A. Pierce, for the last six years manager of the Chicago office of the Brown-Lipe Gear Co., is now associated with the Burgess-Norton Co., Geneva, Ill., as assistant sales manager.

### Savoia-Marchetti Pilot Here

Alessandro Passaleva, test-pilot for the Savoia-Marchetti flying boats, has arrived in this country where he will direct the flying of the fleet of planes



Alfred P. Sloan, Jr., president (right), and Fred J. Fisher, vice-president, General Motors Corp., are shown upon their recent return from Europe, following the Opel purchase.

which the American Aeronautical Corp. is importing from Italy. He will also pass on the first American-built Savoia-Marchetti planes to be manufactured here.

### Federal Names Wilcox

R. W. Ruddon, vice-president and general manager of the Federal Motor Truck Co., has announced the appointment of George D. Wilcox as advertising manager. During the last 18 years Mr. Wilcox has been advertising manager of the Regal Motor Car Co., the Republic Motor Truck Co., and the Detroit Lubricator Co.

### Bower Recovers from Accident

John E. Bower has been reappointed purchasing agent of the Autocar Co., succeeding E. R. Wegener, who held the position temporarily during the past few months while Mr. Bower was recovering from a serious accident.

### Grainger Elected Director

C. A. Grainger, general sales manager of the Allbestos Corp., recently was elected a member of the board of directors.

### Great Lakes Names Hidey

The Great Lakes Aircraft Corp. has announced the election of R. M. Hidey as vice-president in charge of manufacturing.

### Harrell and Bradley Elected

The Graham-Paige Motors Corp. recently elected E. R. Harrell and Thomas Bradley, of Detroit, to its board of directors.

### Peerless Reelects German

L. R. German was reelected president of the Peerless Motor Car Corp. at the recent meeting of its board of directors. Other officers elected include: A. F. Misch, vice-president in charge of manufacturing; F. W. Slack, vice-president in charge of engineering, and F. A. Trester, secretary. At a previous meeting, C. H. Larson was elected chairman of the board to succeed R. M. Calfee, who had asked to be relieved of his duties.

### Masury on European Trip

Alfred F. Masury, vice-president and chief engineer of International Motor Co., sailed a few days ago for a visit among the factories of foreign automotive manufacturers in Europe. He will visit England, France, Germany, Switzerland and Italy. George Wirrer, chief metallurgist of the company, is accompanying Mr. Masury on this trip.

### Olds Appoints Stableford

G. H. Stableford has been placed in charge of Oldsmobile-Viking dealer accounting activities, according to an announcement by D. S. Eddins, vice-president and general sales manager of Olds Motor Works.

### Chevrolet Names Hammond

C. M. Hammond has been appointed sales promotion manager of the Detroit zone of the Chevrolet Motor Co., succeeding J. D. Devine, who becomes regional used car manager.



## Hudson Earns \$2.86 a Share in Quarter

### McAneeny Explains New Record Set in Com- pany's History

DETROIT, April 23—Net earnings of \$4,567,783 are reported by the Hudson Motor Car Co. for the first quarter of 1929, equal to \$2.86 a share on the 1,596,660 shares outstanding. This is the largest first quarter earnings in Hudson's history and compares with the following figures: \$4,207,373 in 1928, \$4,026,516 in 1927, \$2,746,023 in 1926 and \$3,826,932 in 1925.

Commenting on the statement, William J. McAneeny, president, said: "Not only were our earnings for January, February and March the largest first quarter we have known, but our present sales situation and our prospects for the year are correspondingly favorable. Since the middle of February our plants have been operating at their top capacity of 1900 cars a day, or around 45,000 a month, and yet a survey of stocks of cars in the hands of distributors and dealers shows that the number is below normal.

"A year ago there were 33,000 Hudson-Essex cars on hand in the field. Today, with business far more active and the demand higher, there are only 30,000 cars. Usually we consider that a normal stock of cars in the field is a month's supply, which would be around 45,000. Thus we have today 15,000 less than a normal stock of cars in the country, and the active buying season is just opening. In a number of important buying centers there is today a shortage of Hudson and Essex cars for delivery to the public.

"Not only have domestic sales reached a new high record, but our shipments of 11,585 cars overseas and 6178 to Canada were the best we have ever known in a first quarter period."

### Earnings of Auto-Lite Reported as \$3,999,084

TOLEDO, April 23—Net earnings of \$3,999,084 after depreciation but before Federal taxes were reported by the Electric Auto-Lite Co., for the first quarter. This is equal to \$3.74 a share after preferred dividends, comparing with \$1.69 for the first quarter in 1928. Gross profit after depreciation amounted to \$4,361,269 and administrative and selling expenses amounted to \$932,040.

President C. O. Miniger said that if proportionate share of Eclipse Machine Co. and Columbus Auto Parts Co. earnings had been included with Auto-Lite the quarterly earnings per share of common stock would have been \$4.10.

### McLaughlin Denies Report

TORONTO, April 23—Reports that General Motors Co. of Canada, Ltd., is considering transfer of its regional distributing plant to Winnipeg, have been denied by R. S. McLaughlin, president.

## Financial Notes

Chrysler Corp. reports net profit for the first quarter of 1929, including Dodge operations, as \$8,838,173 after all charges. This is equivalent to \$2 a share on outstanding stock and compares with combined net profit of Chrysler Corp. and Dodge Brothers for the corresponding quarter of 1928 of \$6,684,017, or \$1.51 a share on a basis comparable with the present number of shares. Shipments to dealers during the three months totaled 122,758 cars compared with 112,977 cars in the corresponding quarter last year.

H. H. Franklin Mfg. Co. in its annual statement for 1928 reports a net profit of \$589,024, after all charges but before dividend requirements, as compared with net profit of \$226,993 in the previous year, an increase of 160 per cent. Liberal write-offs in 1928 and the payment of quarterly preferred dividends and two common dividends, left a charge of \$110,304 to surplus.

General Foundry & Machine Co. has reported net earnings for the quarter ending March 30, 1929, are \$74,057 net, after depreciation and Federal taxes. The company's sales are showing a marked increase, having risen from \$90,000 in December to \$230,000 in March. Net earnings for March, after depreciation and Federal taxes, were \$31,153.

Paramount Cab Mfg. Corp. reports earnings for the last six months of \$1,014,441. Earnings for the last quarter were \$507,355, or at the rate of annual earnings of \$8 per share on capital stock of the corporation. These figures are before deduction for Federal taxes. A. S. Freed, president, reports that orders are beginning to be placed from other cities.

Johns-Manville Corp. reports net profit for the first quarter of the current year after all charges as \$1,106,089. This is equivalent after preferred dividend to \$1.30 a share on common stock and compares with earnings of \$772,705, or 85 cents a share, for the first quarter of 1928.

Allied Motor Industries, Inc., reports income for the quarter ended March 31 before taxes as \$171,082. This compares with \$123,985 for the same period of 1928. These figures do not include income from Great Lakes Aircraft Corp., two-thirds of the Class B stock of which is owned by Allied.

Perfect Circle Co. reports net profit for the quarter ended March 31 after all charges as \$205,232, or \$1.26 a share on outstanding stock. This compares with \$126,128, or 77 cents a share, for the corresponding quarter a year ago.

Motor Products Corp. has called for redemption on May 19 all outstanding preferred stock at \$60 a share and accrued dividends. Retiring directors of this corporation were reelected at its annual meeting.

B. F. Goodrich Co. at its annual stockholders' meeting approved a plan to increase authorized common stock from 1,000,000 to 1,500,000 shares. It was planned to issue 207,728 shares, giving present stockholders rights to purchase the new stock at \$81 a share in the ratio of one new common for every four held. These rights

expired on April 24. C. M. Keys, president of Curtiss Airplane and Motor Co. and a member of other aeronautical enterprises, was elected a director to fill a vacancy on the board.

General Spring & Bumper Corp. directors met this week and recommended to the stockholders a plan for distributing among the holders of each share of Class A or Class B stock an additional one-half share of Class B stock. Details of the plan are being worked out and will be submitted to stockholders at the annual meeting May 15. The company was formed in February to purchase the assets of the C. G. Spring & Bumper Co. and to acquire the voting stock of Biflex Products Co., of Chicago.

Marmon Motor Car Co., made public by G. M. Williams, president, shows net earnings for the fiscal year ended Feb. 28, 1929, of \$1,447,919.83, after depreciation amounting to \$283,880.23, and all other charges except Federal income tax. After deducting dividends on preferred stock amounting to \$70,000, this net earning for the year is equivalent to \$6.01 per share after provision for Federal income tax on the 200,000 shares common stock outstanding during practically the entire year.

Bendix Corp. has called a stockholders' special meeting for May 7 to ratify the organization of the Bendix Aviation Corp., which is to be the successor of the existing company. A new board of directors will be elected and stockholders will be asked to approve the exchange of two shares of Bendix aviation stock for one share now held in the Bendix Corp.

Allis-Chalmers Mfg. Co. reports for the quarter ended on March 31 a net profit of \$1,013,375 after depreciation, Federal taxes and other charges, equivalent to \$3.65 a share earned on 277,636 shares outstanding. This compares with \$710,278 or \$2.73 a share on 260,000 shares in the preceding quarter and \$675,600 or \$2.60 in the first quarter of 1928.

Martin-Parry Corp. reports net loss for the quarter ended Feb. 28 of \$53,213. This compares with net loss for the corresponding quarter of the previous year of \$198,398. Net loss for the six months ended Feb. 28 amounted to \$90,866, compared with net loss for the first quarter of the previous fiscal year of \$241,802.

Hupp Motor Car Corp. reports net income for the quarter ending March 31 as \$1,501,595, after all charges including depreciation and Federal taxes, equal to \$1.10 a share on 1,362,498 shares of \$10 par capital stock. This compares with net profit of \$1,615,528, or \$1.60 a share earned on 1,005,198 shares for the first quarter of 1928.

Checker Cab Mfg. Corp. reports net earnings for the first quarter of 1929 after all charges as \$1,792,669. This is equivalent to \$4.78 a share and compares with \$205,611, or 54 cents a share, for the corresponding quarter of 1928.

Jordan Motor Car Co. reports net profit for the first quarter after all charges as \$57,509. The profit for the month of March was \$54,695.



## Ford Motor Co. to Increase Activities With Balanced Output of Its 18 Types

DETROIT, April 25—Announcement of plans for an increase in production during the remaining spring months was made this week by the Ford Motor Co. in a statement discussing the current building program. The manufacturing schedule has been balanced to provide for an output of the entire line of passenger cars and commercial vehicles, which now includes 18 different types, the recent additions being the chauffeur-driven town car, town sedan, sport cabriolet, taxicab, station wagon and the de luxe delivery wagon.

The following statement was made by the company:

"The production program has been arranged to include the new body types designed for the Model A chassis and production has been stimulated due to current orders. The new types are being built without curtailment of the program for the other standard cars. Orders on hand are large and reports from branches and dealers indicate that the spring demand is greater in volume than was anticipated.

"During March the rate of production was increased to more than 8000 cars and trucks a day. Total production for March was 181,894 cars as compared with 125,984 in February.

"Although retooling the factories for

the Model A car was completed some time ago, many of the machines employed last year have been rendered obsolete by new machinery developed within the organization. This has been or is now being installed. New machinery has resulted in simplified methods in many manufacturing divisions and in addition to making possible greater precision has contributed with other efficiencies toward the high production rate.

"Three new furnaces have been added to the number of open hearths at the Rouge steel mill, making ten in all, each being capable of 200 tons daily. Deducting time necessary for the frequent relining of the furnaces, the minimum capacity is 50,000 tons a month. The company is now in a position to produce almost twice the tonnage in steel ingots that it did in 1926, and 30 per cent more than was possible in 1928.

"The six-day factory week, which went into effect at Dearborn March 1, has been of great assistance in building up the production schedule and has permitted the development of an expanded program for the spring and summer months. The output of the new body types will be increased in accordance with this schedule."

## Erskine Explains Saving in Moving to South Bend

SOUTH BEND, April 23—Material progress toward the saving of between \$3,000,000 and \$4,000,000 per year in operating costs of the enlarged Studebaker Corp. plant in South Bend, through the transfer of major operations from Detroit to the central factory, will be made during April, A. R. Erskine, president, stated today.

The company recently announced the addition of two-passenger and four-passenger coupes on both the Six and Eight Commander chassis. The prices of the two-passenger models are \$1,350 for the Six and \$1,495 for the Eight, while the prices for the Six and Eight four-passenger models are \$1,425 and \$1,550, respectively. All prices are listed at the factory.

## Eaglerock "Bullet" Plant to be Built at St. Louis

ST. LOUIS, April 23—An assembly plant for the new Eaglerock "Bullet," low-wing cabin monoplane, is to be erected at Lambert-St. Louis Field by the Von Hoffmann Aircraft Co., Eaglerock distributor in this territory.

Plans for the factory are being prepared under the direction of J. Don Alexander, president of the Eaglerock Co. of Colorado Springs. The plant will be situated on a four-acre site adjoining the airport. The ground is

owned by Albert Von Hoffmann, president of the Von Hoffmann Co., which operates a flying school, sales agency and service department.

The Eaglerock "Bullet" is powered with a Whirlwind engine and in tests made 160 m.p.h. The ship has places for four passengers and pilot. The establishment of the Eaglerock plant here will give St. Louis its fifth aircraft factory.

## Spark Plugs in Parade

TOLEDO, April 22—Thirty trucks carrying more than \$375,000 worth of spark plugs paraded streets of Toledo on their way to dealers in Ohio, Michigan and West Virginia as a part of their stock for "National Change Week" in May. The Champion Spark Plug Co. is now busy stocking automotive accessory dealers and this one drive-away carried more than 500,000 new spark plugs.

## German Tire Firms Merge

BERLIN, April 20—Two of the largest German tire works, the Continental of Hanover and the Peter of Frankfort-on-Main, were merged recently. The Continental Works, which operated with a capital of 40 million marks, had a turnover of 122 million last year, while the Peter, which had a capital stock of nine million, had a turnover of 25 million. The turnover of the Continental last year was substantially one-half that of the total German busi-

ness in tires. At one time the B. F. Goodrich Co. owned a considerable interest in the Continental Company, but this is said to have been repurchased by a banking group close to the German company. Negotiations are said to be in progress also for the inclusion of the Pollack firm of Waltershausen in Thuringia in the combine.

## Airport Convention Scheduled for May

NEW YORK, April 23—The first annual airport convention under the auspices of the Airport Section of the Aeronautical Chamber of Commerce will be held at Cleveland, May 15 to 17, inclusive. It is expected that approximately 1000 persons from all parts of the country, including leading figures in the aeronautical world, will be present at this convention.

Guests of honor and speakers will include William P. McCracken, Jr., Assistant Secretary for Aeronautics, Department of Commerce; F. Trubee Davison, Assistant Secretary of War for Air; David S. Ingalls, Assistant Secretary of the Navy for Aeronautics; W. Irving Glover, second Assistant Postmaster-general, Air Mail Division.

Major Clarence M. Young, Director of Aeronautics, Department of Commerce; Major-General James E. Fechet, chief, Air Corps, United States Army; Senator Hiram Bingham, president, National Aeronautical Association; John B. Marshall, Mayor, City of Cleveland; William B. Stout, president, Stout Air Services, Inc.; W. S. Evans, vice-president, North Central Division, Aeronautical Chamber of Commerce, and F. B. Rentschler, president of the Aeronautical Chamber of Commerce.

## East Indies Add Imports

WASHINGTON, April 25—Exports of American motor vehicles to the Netherland East Indies last year numbered 8829, increasing 1743 or 24 1/5 per cent over the total of 7986 during 1927, says a report received this week by the Department of Commerce. Parts and accessories reached a new high figure, amounting to \$1,202,465 last year as compared with \$850,207 in the previous year, the report notes.

## G.M. Has 43,500,000 Shares

NEW YORK, April 23—General Motors Corp. now has outstanding 43,500,000 shares of common stock, according to a survey recently made by the *Wall Street Journal*. The corporation thus leads by a considerable margin all other companies represented on the New York Stock Exchange. These shares have a market value of approximately \$3,700,000,000.

## Plymouth Opens Office

The Plymouth Motor Corp. has opened district offices at Los Angeles with H. M. Laib in charge.

## City Auto Stamping Begins New Factory

Unit Involving \$500,000 is to  
be Ready in About Two  
Months

TOLEDO, April 24—Work on the new plant of the City Auto Stamping Co. on its 30-acre site here has been started and is to be completed in about 60 days. The new plant will be 240 ft. wide and 325 ft. long, with a portion of it two stories. It will represent an investment of \$250,000 and the equipment will also run about that same amount. The H. J. Spieker Co., general contractors, are doing the construction work. Plans were prepared by Langdon, Hohly & Gram, architects.

Amos Lint, president of the City Machine & Tool Co., is president of the new company, which will make heavy stampings for the automobile industry. C. O. Miniger, president of the Electric Auto-Lite Co., is also heavily interested in the new company. The company marketed 150,000 shares of its common stock at \$6 a share by issuance of warrants to the stockholders of the City Machine & Tool Co.

A new engineering building is also under construction now by the Sam Davis Co., owners of the Toledo Factories building, for the City Machine & Tool Co., a tenant of this building.

## G.M. Safety Work Effective

DETROIT, April 23—Safety-first work in General Motors plants made great strides in 1928, according to a report just issued by the corporation. There were eight fatalities in the plants during last year, which is just one-half the number of fatalities in 1927, and per hours of work the decrease is 65 per cent. The record is held unusual especially when it is considered that General Motors has 220,000 employees in its plants. The company reports that the families of most of its workers who died last year were aided by General Motors Group Insurance.

## Toledo Employment Up

TOLEDO, April 22—Employment in Toledo plants took a jump during the last week, showing a net gain of 896 workers in 51 firms to total 47,592 as compared with 38,207 at same time last year.

## Clark Sets Record

DETROIT, April 23—The Clark Equipment Co., of Buchanan, Mich., reports that March was the biggest month in the company's history.

## Drake Changes Name

BELL, CAL., April 22—J. A. Drake & Sons, Inc., has announced the change in the firm name to Jadson Motor Valve Co. The company is now installed in its new plant in this city.

## Britain Explains Aircraft Industry

WASHINGTON, April 25—British airplane producers had a "fairly good year" during 1928, according to a London report received this week by the Department of Commerce. One new firm was started and none was compelled to shut down, says the report. The success of all-metal construction is now established in Great Britain, says the report.

## Soviet Automobile Plant May Be Separate Project

NEW YORK, April 22—The Soviet government in Russia recently announced that it would build a plant for the manufacture of automobiles in Russia. Details as yet available are very meagre but it seems probable that this plant, which is to have a capacity of 100,000 vehicles a year, will be located either in Moscow or Niji Novgorod.

The major part of the output will probably be light trucks for industrial and agricultural use. It is intimated that these cars may resemble Ford production, but this is largely a matter of speculation as yet. Information available here would indicate that this project is entirely separate from the negotiations which have been reported to be taking place between the commission of the Soviet government and General Motors Corp. and the Ford interests. It is hardly expected that this plant will be ready for production within the next three or four years. Meanwhile it is intimated that there is still a possibility of some American manufacturer entering into some sort of agreement with the Soviet for the manufacture of American designed cars in Russia.

## Export Committee Chosen

NEW YORK, April 22—Asbestos Brake Lining Association at its regular meeting appointed a foreign trade committee. This committee, under the chairmanship of J. R. Kelsey of the Russell Mfg. Co., consists in addition of W. T. Dodge of Ferodo and Asbestos, Inc., and H. W. Tuman of Keasbey & Mattison. Routine business took up the rest of the time of the meeting.

## Graham-Paige at 500 Daily

DETROIT, April 22—The Graham-Paige Motors Corp. reports its production as in excess of 500 cars daily. The company recently turned out its 100,000th car, 15 months after its new six and eight-cylinder line was introduced. The company has started production of its two-door sedan models on the 612 and 615.

## March Production Totalled 625,354

Government Figures Show  
Output in First Quarter  
as 1,554,210

WASHINGTON, April 22—The total March production of passenger cars and trucks in the United States and Canada was 625,354, according to figures compiled by the Department of Commerce from reports of 151 manufacturers in this country and from Dominion Bureau of Statistics. This new all-time record exceeds the output for February (the previous all-time record for a single month's production) by 118,694 units, and surpasses the preceding all-time record, in August, 1928, by 132,811 units. It compares with a production of 430,783 automobiles and trucks in March, 1928.

Production for the first three months of 1929 was 1,554,210 units, compared with 1,007,274 in the corresponding period last year, a difference of 546,936 units. The following table is based on the Department of Commerce report and shows revised figures for January and February of this year as well as for November and December, 1928:

1928			
	Cars	Trucks	Total
Jan. ....	212,351	27,840	240,191
Feb. ....	301,466	34,834	336,300
Mar. ....	387,048	43,735	430,783
Total ..	900,865	106,409	1,007,274
Apr. ....	385,394	48,921	434,315
May ....	405,627	54,098	459,725
June ...	381,963	43,232	425,195
July ....	358,914	58,398	417,312
Aug. ....	424,867	67,676	492,543
Sept. ...	375,463	61,044	436,507
Oct. ....	353,162	62,658	415,820
Nov. ....	*225,608	*43,301	*268,909
Dec. ....	*212,727	*30,814	*243,541
Total ..	4,024,590	576,551	4,601,141
1929			
Jan. ....	366,275	*55,921	422,196
Feb. ....	*442,432	*64,228	*506,660
Mar. ....	548,007	77,347	625,354
Total ..	1,356,714	197,496	1,554,210

\*Revised.

## Charles F. Folkman

CLINTONVILLE, WIS., April 22—Charles F. Folkman, member of the board of directors of the Four Wheel Drive Auto Co. for 18 years and vice-president of the company for 12 years, died at his home here recently. Mr. Folkman, who was 64 years old, was also a member of the board of directors of the Menominee Motor Truck Co., and operated a large department store in this city.

## Piston Ring at New Mark

DETROIT, April 21—The Piston Ring Co., Muskegon, has announced that March showed the greatest volume of business the company has enjoyed since it began business.



## Hayes Products Co. Joins Victor Body

DETROIT, April 23—H. J. Hayes Industries, Inc., has been formed under the laws of Michigan and will take over all of the properties of the Hayes Products Co. and the Victor Body Corp., organized at Lansing a year ago by H. J. Hayes. The idea of the new corporation is to centralize the activities of the two former companies under one head.

Officers of the corporation are: H. J. Hayes, president; V. H. Kendall, Detroit, vice-president; Victor Preston, vice-president; Homer Schwerer, Chicago, secretary. In addition to these Charles Porter, Chicago; J. W. Wilford and E. C. Shields, Lansing, will serve as directors.

The new corporation has an authorized capitalization of \$3,500,000, including 500,000 shares of Class A preferred no par stock at a declared value of \$5 a share and 1,000,000 shares of Class B no par stock at a declared value of \$1 a share.

Mr. Hayes already has invested \$450,000 in cash in the land, buildings and other properties owned by the Victor Body Corp. and the Hayes Products Corp. The new corporation takes over all land, buildings and assets of the two former companies and is offering stock in the new concern for the properties purchased. Mr. Hayes is taking stock in the new corporation for his holdings in the other concerns.

## Howell Electric to Build

DETROIT, April 23—The Howell Electric Motor Co., of Howell, Mich., manufacturer of electric motors, will erect a new addition to its plant to provide for increased capacity. The company announces it is introducing a new product.

## Australia Extends Roads 4500 Miles

WASHINGTON, April 25—Australian states have constructed 4500 miles of highway with the assistance of the Federal Government since the Federal-aid roads agreement two years ago, says a report from the Melbourne Consulate received by the Department of Commerce this week.

## Durant Exports Increase

DETROIT, April 22—Despite interruption necessitated by move early this year of major manufacturing activities from Elizabeth, N. J., to Lansing, Mich., total overseas shipments of Durant and Rugby cars and trucks by Durant Motors, Inc., during the first quarter, this year, according to H. P. Gilpin, export sales manager of the company, showed a gain of 26 per cent compared with exports during the corresponding period last year. The total reported for first quarter this year is 5730 and for the first quarter last year, 4546.

## George H. McDade

TOLEDO, April 22—George H. McDade, aged 64 years, general master mechanic of Willys-Overland, Inc., died in a Toledo hospital recently from a complication of diseases. Mr. McDade had spent practically his entire life in automobile production. In the early days he was superintendent of the Flint Wagon Works and later joined the Buick Motor Co., where he rose to the position of master mechanic. He leaves a widow, two daughters and two sons.

## Program Started by Central Alloy

CANTON, April 23—A program of improvements costing approximately \$1,000,000 is being carried out by the Central Alloy Steel Corp. over the first half of the year. A substantial portion of the expenditure is for the large expansion plans in connection with the manufacture of the new Krupp Nirosta stainless alloys.

As a part of the program the company is constructing a new induction reclaiming furnace at a cost of \$245,000. This equipment will be in operation by July 1 and will permit the reclaiming of stainless steel scrap without the loss of chromium and nickel. Such reclamation of valuable alloys has become a factor of increasing importance with the widening use of stainless steel.

Other improvements include the construction of a new billet cleaning building at a cost of \$370,000 and a new soaking pit costing \$90,000 at the Canton plant.

## G. E. Orders Increase

SCHENECTADY, April 22—Orders received by the General Electric Co. for the first quarter of 1929 amounted to \$101,365,208, compared with \$79,925,840 for the corresponding three months of last year, an increase of 27 per cent, Gerard Swope, president of the company, has announced. Twenty-one directors of the company were reelected at the recent annual meeting.

## Wood Hydraulic Expands

DETROIT, April 23—Wood Hydraulic Hoist & Body Co. has added 18,000 sq. ft. of floor space to its body plant in Detroit. The addition was made necessary by rapidly increasing business in the body division.

# Calendar of Coming Events

### SHOWS

Melbourne Automobile Show.....May 2-11  
International Aircraft Exhibition, Olympia, London.....July 16-27  
International Aircraft Exhibit, Coliseum, Chicago.....Sept. 7-15  
Paris, Automobiles.....Oct. 3-13  
London, Automobiles.....Oct. 17-26  
Prague, Automobiles.....Oct. 23-30  
Paris, Motorcycles.....Oct. 23-Nov. 3  
M.&E.A. Show and Convention, Chicago.....Nov. 4-9  
N.S.P.A. Show and Convention, Detroit.....Nov. 11-16  
Berlin Auto Salon.....Nov. 14  
London, Trucks.....Nov. 7-16  
Paris, Trucks.....Nov. 14-24  
London, Motorcycles.....Nov. 30-Dec. 7  
Brussels Auto Salon.....Dec. 7

### CONVENTIONS

Chamber of Commerce of U. S., Meeting, Washington, D. C.....April 29-May 3  
National Safety Congress Meeting, Kansas City.....April 30-May 2  
American Society of Mechanical Engineers, Detroit.....May 1-3  
American Management Association, New York.....May 6-11  
National Safety Congress Meeting, Detroit.....May 7-9  
National Highway Traffic Association, Hotel Stevens, Chicago.....May 13-15

A.S.M.E. Meeting, Rochester, N. Y., May 13-16  
First Annual Convention of Airport Section, National Aeronautical Chamber of Commerce, Cleveland.....May 15-16  
National Hardware Association (Metal Branch) Annual Meeting, Detroit, May 16-17  
American Gear Manufacturers' Association, Annual Meeting, Hotel Statler, Cleveland.....May 16-18  
A.S.M.E. Aeronautic Meeting, St. Louis, May 27-30  
Joint Meeting, Oil and Gas Power Division of the American Society of Mechanical Engineers and Pennsylvania State College, State College, Pa.....June 24-27  
American Society Testing Materials, Annual Meeting, Atlantic City, June 24-28  
American Welding Society, Fall Meeting and Exposition, Cleveland.....Sept. 9-12  
American Institute of Mining and Metallurgical Engineers, Cleveland, Sept. 9-12  
American Society for Steel Treating, Convention and Exposition, Cleveland.....Sept. 9-13  
A.S.M.E.—Iron and Steel Division—National Meeting, Cleveland.....Sept. 11-13  
Society for Electrical Development, New York City.....Sept. 13

Eastern States Exposition, Springfield, Mass.....Sept. 15-21  
National Machine Tool Builders' Association, Cleveland.....Sept. 30-Oct. 4  
National Safety Congress, Annual, Chicago.....Sept. 30-Oct. 4  
Society of Industrial Engineers, Detroit.....Oct. 16-18  
World Engineering Congress, Tokio, Japan.....Oct. 29-Nov. 22

### RACES

Akron.....May 12  
Gardner Trophy (Aircraft), St. Louis, May 28-30  
Indianapolis.....May 30  
Detroit.....June 9  
Altoona, Pa.....June 15  
Rudge Whitworth Cup, Le Mans, June 15-16  
Salem, N. H.....June 29  
French Grand Prix.....June 30  
Akron.....Aug. 13  
National Air Races and Show, Cleveland, Aug. 24-Sept. 2  
Syracuse.....Aug. 31  
Altoona, Pa.....Sept. 2  
Cleveland.....Sept. 15  
Salem, N. H.....Oct. 12

### S. A. E.

Summer Meeting, Saranac Lake.....June 25-28  
Aeronautic Meeting, Cleveland.....Aug. 26-28  
Production Meeting, Cleveland.....Oct. 2-4